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INSTRUCTOR'S MANUAL

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FLOOD HAZARD MANAGEMENT AND NATURAL RESOURCE PROTECTION

INSTRUCTOR'S MANUAL

Prepared by The Conservation Foundation under contract to
the Federal Emergency Management Agency

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PREFACE

This Trainers' Manual is designed to serve as a detailed guide for individuals or organizations interested in conducting the training program on community flood hazard management and natural resource protection developed by The Conservation Foundation for FEMA. Many of the principles discussed here are also applicable to training programs on a wide range of topics. This manual supplements the two model training institute programs developed by CF, for FEMA, following an evaluation of two pilot training institutes conducted in May, 1980. One model program addresses coastal flooding problems, and the other, riverine flooding problems.

These programs, designed for local officials and key citizen leaders, have several important objectives:

- educating community leaders on the causes of flooding (natural and man-induced) and the role which natural resources can play in mitigating flood hazards;
- educating community leaders about alternative strategies for flood hazard management including the requirements of the National Flood Insurance Program (NFIP) and strategies which go beyond the minimum requirements of the NFIP;
- educating community leaders on the importance of public participation in the decision-making process, the key steps where public input can be most valuable and the range of tools and techniques available to achieve effective public participation;
- instilling in community leaders a desire to apply the lessons of the institute in their own communities; and
- providing participants with an opportunity to develop specific follow-up plans to improve flood hazard management in their community and/or region.

Each of the pilot training institutes from which this final program model was derived was organized around a multi-state region. The pilot programs were designed for 100-125 participants. Most participants came from communities within the region, with no more than three or four from any given community--each representing a local community perspective (local government, business, environmentalist, civic leadership). The program as presented in this training manual, however, is applicable for use or adaptation to a variety of small- and large-scale geographic divisions, and with audience sizes ranging from 25 to 125--so long as the program is directed to the community level.

The Trainers' Manual is intended to assist you, the Training Institute Coordinator, in conducting a successful training program which meets these objectives. Included in this manual are:

1) Summaries of the model training programs;
2) Detailed guidance for the Training Institute Coordinator on how to organize the institute from start to finish;
3) Detailed lesson plans for each program describing the 17 elements which comprise the 2-1/2 day program; and
4) Detailed Appendices including samples of invitation letters, briefing memos, and training materials.

Those of you planning to organize a training institute should read through this manual carefully before taking your first step. It's essential that you understand fully the nature and complexity of your job from the outset. Careful advance planning can help you avoid a multitude of disappointments and missed opportunities along the way and ensure a successful Institute.

Specifically, you will probably want to refer to the section on "Information for the Institute Director" throughout your planning process. You will also want to provide each of your confirmed resource people (speakers, workshop leaders, etc.) with a copy of the detailed lesson plan for their respective sessions.

Most of you will have no problem identifying which version of the program (Coastal or Riverine) best suits the needs of your community, state, or region. However, some of you may be considering a geographic area which includes both coastal and riverine communities and wish to address both types of flooding problems in a single training institute. If this is the case, we suggest you carefully study both programs, identify the elements which differ between the two programs, and then modify the program to include concurrent sessions addressing both coastal and riverine issues.

The program has been designed to extend over a two-and-a-half day period (refer to Figure I Sample Time Plan for a layout of the model program). If utilized in a single community, it may be necessary or desirable to divide the training course into, for instance, two-hour components, and to run the course once a week (in the evenings) for nine weeks.

Figure I

SAMPLE TIME PLAN
(For a 2-1/2 day workshop)

FLOOD HAZARD MANAGEMENT AND NATURAL RESOURCE PROTECTION TRAINING INSTITUTE

Time	DAY ONE	DAY TWO	DAY THREE
8:30		FLOOD HAZARD MANAGEMENT - 3 STORIES	ISSUES IN PUBLIC PARTICIPATION
9:00		DESIGNING A FLOOD HAZARD MANAGEMENT PROGRAM: IDENTIFYING GOALS, OPPORTUNITIES AND STRATEGIES	
9:30			BREAK
10:00		THE FEDERAL AND STATE FRAMEWORK FOR COMMUNITY FLOOD HAZARD MANAGEMENT DECISION MAKING	DESIGNING A FLOOD HAZARD MANAGEMENT PROGRAM IN COASTAL COMMUNITIES
10:30			
11:00	REGISTRATION	BREAK	
11:30		THE NATIONAL FLOOD INSURANCE PROGRAM: WHAT IT DOES AND DOESN'T DO	
12:00			LUNCH
12:30		LUNCH	
1:00	INTRODUCTION		
1:30	INTRODUCTION OF PARTICIPANTS	FLOOD HAZARD MANAGEMENT: ISSUES AND PROGRAMS	
2:00	BREAK		FINAL SMALL GROUP DISCUSSIONS
2:30	FLOODING AND FLOOD HAZARD MANAGEMENT IN COASTAL AREAS: AN OVERVIEW		
3:00		LOCAL STRATEGIES FOR FLOOD HAZARD MITIGATION: CASE EXAMPLES	
3:30		BREAK	COMMUNITY FLOOD HAZARD MANAGEMENT: A CHALLENGE TO WORK TOGETHER
4:00	ESTABLISHING THE GOALS OF COMMUNITY FLOOD HAZARD MANAGEMENT	THE ROLE OF PUBLIC PARTICIPATION IN COMMUNITY FLOOD HAZARD DECISION MAKING	
4:30			ADJOURN
5:00		SOCIAL HOUR	
5:30	SOCIAL HOUR		
6:00	DINNER	DINNER	
6:30			
7:00			
7:30	THE NATURE OF FLOODING IN COASTAL COMMUNITIES AND THE SPECIAL ROLE OF COASTAL ECOLOGICAL RESOURCES IN FLOOD HAZARD MITIGATION	RECOMMENDATIONS FOR GROUP ACTION	
8:00			
8:30			
9:00			
9:30			

MODEL PROGRAM OUTLINE

(Lesson Plan Titles and Scope)

DAY ONE

11:00 a.m. -
1:00 p.m. INSTITUTE REGISTRATION

1:00 WORKSHOP INTRODUCTION (Lesson Plan No. 1)

Scope:
Official opening of the workshop by welcoming participants, officials and guests; a general description of the workshop purpose, objectives, scope and subject areas; welcoming remarks of dignitaries; introduction of group coordinators and/or staff instructors, assignment of participants to groups; orientation to sequence of workshop sessions, time schedules, and facilities (notation of agenda changes, if necessary) administrative announcements.

Activity:
Plenary Session. Speech. Questions and Answers.

1:30 - 2:15 INTRODUCTION OF PARTICIPANTS (Lesson Plan No. 2)

Scope:
Introduction of participants to others sharing similar geographical area (state, substate, watershed). Participants share with each other what they bring to the Institute and what they hope to accomplish. Brief discussion of participant community flooding problems and review of purpose of small group discussions.

Activity:
Small Group Discussions within the Plenary room. Groups divided according to geographic criteria.

2:15 - 2:30 BREAK

2:30 - 4:00 FLOODING AND FLOOD HAZARD MANAGEMENT IN COASTAL AREAS: AN OVERVIEW (Lesson Plan No. 3)

Scope:
The nature of coastal flood hazards; the special economic, social, and environmental problems of protecting coastal populations and properties from flood damage; the difficulties of timely and accurate hurricane prediction; ecologically sensitive areas in the coastal floodplain; an historical perspective on coastal flood hazard management, the traditional problem solving approach vs. new directions; why government policies are changing.

Activity:
Plenary Session. Film followed by Reactor Panel Questions and Answers.

4:00-4:45 ESTABLISHING THE GOALS OF COMMUNITY FLOOD HAZARD MANAGEMENT (Lesson Plan No. 4)

Scope:

Identification and discussion of major goals for community flood hazard management. Categorization of goals according to interest group.

Activity:

Plenary Session. Participants complete exercise listing major goals. Institute Director records goals on newsprint according to categories of interest groups. Discussion followed by group ranking of goals.

5:15 - 6:00 SOCIAL HOUR

6:00 - 7:30 DINNER

7:30 - 9:30 THE NATURE OF FLOODING IN COASTAL COMMUNITIES AND THE SPECIAL ROLE OF COASTAL ECOLOGICAL RESOURCES IN FLOOD HAZARD MITIGATION (Lesson Plan No. 5)

Scope:
Description of special ecological characteristics and hazard mitigation functions of natural coastal systems: beaches, oceans, estuaries, bays, and tidal rivers. Presentation of land

use suitability analysis concepts. Actual experiences utilizing natural resource maps as decision-making tools.

Activity:
Concurrent Small Group Sessions. Mini-lecture followed by group discussions.

DAY TWO

8:30 a.m. FLOOD HAZARD MANAGEMENT: THREE STORIES
(Lesson Plan No. 6)

Scope:
Brief review of rationale for community flood hazard management. Presentation of three community approaches to particular flooding problems.

Activity:
Plenary Session. Slide Presentation.

8:45 - 9:45 DESIGNING A FLOOD HAZARD MANAGEMENT PROGRAM:
IDENTIFYING GOALS, OPPORTUNITIES AND STRATEGIES
(Lesson Plan No. 7)

Scope:
Review of flood hazard management goals used by communities depicted in the slide show. Discussion of various opportunities and strategies available to the communities in the slide show during both the pre- and post-stages of flood hazard management. Emphasis on importance of local initiative. Relating goals and actions of communities in the slide show to goals listed by participants early in the Institute.

Activity:
Small group discussions within plenary Session. Completion of group exercise.

9:45 - 11:00 THE FEDERAL AND STATE FRAMEWORK FOR COMMUNITY
FLOOD HAZARD MANAGEMENT DECISION MAKING
(Lesson Plan No. 8)

Scope:
Various federal and state programs that affect coastal flood hazard management including: NFIP, Floodplains and Wetlands Executive Orders, Coastal Zone Management and State Natural Resource Management Programs.

Activity:
Plenary Session. Speech followed by roundtable discussion of key questions posed by moderator. Questions and Answers.

11:00 - 11:15 BREAK

11:15 - 12:15 THE NATIONAL FLOOD INSURANCE PROGRAM: WHAT IT DOES AND DOESN'T DO (Lesson Plan No. 9)

Scope:
Minimum requirements of the NFIP, basic tools (maps, FIS study, flood profiles) provided by NFIP, issues which NFIP addresses, issues not addressed by NFIP.

Activity:
Plenary Session. Speech followed by roundtable discussion of key questions posed by moderator. Questions and Answers.

12:15 - 1:30 LUNCH

1:30 - 2:30 FLOOD HAZARD MANAGEMENT: ISSUES AND PROGRAMS (Lesson Plan No. 10)

Scope:
Detailed look at various issues and programs relating to the NFIP including: building standards, NFIP regulations, Section 1362 of National Flood Insurance Act of 1968, flood hazard mapping, Coastal Zone Management.

Activity:
Concurrent small group sessions. Mini-presentation by group leader followed by group discussions.

2:45 - 3:45 LOCAL STRATEGIES FOR FLOOD HAZARD MITIGATION: CASE EXAMPLES (Lesson Plan No. 11)

Scope:
Review of specific strategies that different communities have employed to manage coastal flood hazards, highlighting community goals, the design and implementation of the strategy, and the role of federal, state, local and public actors. The focus will be on key

factors in making the strategy work. Specific strategies addressed might include: relocation, recreation/acquisition, storm water management, zoning, critical areas protection, development standards.

Activity:
Concurrent small group sessions. Mini-lecture by group leader followed by group discussion of specific case examples.

3:45 - 4:00 BREAK

4:00 - 5:00 THE ROLE OF PUBLIC PARTICIPATION IN COMMUNITY FLOOD HAZARD DECISION MAKING (Lesson Plan No. 12)

Scope:
Importance of public involvement, various publics affected by flood hazard management programs, performance standards for effective public involvement, tools and techniques for public involvement.

Activity:
Plenary Session. Speech followed by roundtable discussion of key questions posed by moderator. Completion of group exercise. Questions and Answers.

5:00 - 6:00 SOCIAL HOUR

6:00 - 7:30 DINNER

7:30 - 9:30 RECOMMENDATIONS FOR GROUP ACTION (Lesson Plan No. 13)

Scope:
Continuation of earlier group discussion of community problems, state problems, action required to resolve problems (i.e., better data and data analysis, public education and involvement, intergovernmental cooperation, social and economic considerations).

Activity:
Concurrent small group discussions.

DAY THREE

8:30 - 9:30 a.m. ISSUES IN PUBLIC PARTICIPATION (Lesson Plan No. 14)

Scope:
Specific issues and tools relating to effective public participation: goal setting, coalition building, bargaining and negotiation, communication skills, motivating the public.

Activity:
Concurrent small group sessions. Mini-lecture by group leader followed by group discussion.

9:30 - 10:00 BREAK

10:00 - 12:00 DESIGNING A FLOOD HAZARD MANAGEMENT PROGRAM IN COASTAL COMMUNITIES (Lesson Plan No. 15)

Scope:
Analysis of the tradeoffs involved in designing a community flood hazard management program uses. Group exercise case study information on physical characteristics, population, flood problems, economic/social considerations, political context; present community maps and flood hazard areas; pre-flood and post-flood opportunities, goals development, legal institutional framework, specific strategies.

Activity:
Concurrent small group sessions. Facilitator leads group in discussion of case study materials and set of specific questions.

12:00 - 2:00 LUNCH

2:00 - 3:00 FINAL SMALL GROUP DISCUSSIONS (Lesson Plan No. 16)

Scope:
Continued discussion of specific opportunities and strategies which should be implemented at the local and/or regional (state) level to improve flood hazard management. Identification of specific steps which participants intend to take following the Institute to achieve their goals.

Activity:

Concurrent small group sessions.

3:30 - 4:30 COMMUNITY FLOOD HAZARD MANAGEMENT: A CHALLENGE TO WORK TOGETHER (Lesson Plan No. 17)

Scope:

Presentation and discussion of group follow-up plans, concluding remarks by workshop director. Participant evaluation and verbal feedback.

Activity:

Plenary Session. Presentations by working group leaders. Concluding remarks. Completion of evaluation forms.

INFORMATION FOR THE INSTITUTE DIRECTOR

Conducting a Training Institute of this scale and complexity is no easy task. At a minimum, it requires solid organizational skills, and a staff of at least two to three hard workers who have both the energy and the enthusiasm to make the program a success.

Assuming your organization meets these minimum criteria, we offer in this section detailed guidance on key aspects of preparing and conducting such a program. This information reflects The Conservation Foundation's extensive experience in developing and conducting training programs.

A. ORGANIZATIONAL GUIDANCE

In calling this section organizational guidance we are making a rather arbitrary distinction between the administrative and logistical problems of organizing an Institute and the program itself. The two are interrelated and cannot be easily separated. Much of the success of the substantive program will depend upon the logistical details that back it up.

An institute organizer should begin with the basic assumption that if anything can go wrong, it will. Some of the things that may happen, are:

- speakers cancel at the last minute;
- audio visual equipment doesn't arrive, or doesn't work, or isn't set up;
- rooming lists are misplaced; and
- rooms reserved by the Institute at the conference facility are switched by the staff of the facility at the last minute--and the new rooms no longer meet the needs of the Institute.

You and your staff will need to stay a step ahead of the program at all times, and check on each detail, leaving yourself time to take care of emergencies. The logistical key to staging a successful conference is to ensure that no one except your own staff knows what's going wrong, and to think positively in solving problems. Confused conference logistics can leave everyone with a bad taste, and undermine the efforts of otherwise excellent speakers and discussion leaders.

1. Objectives of Training Program

Possibly the most important first step in implementing this type of training program is to ensure that you and your staff have a clear understanding of the objectives of the course. Although this may seem an obvious point, we believe it's one worth stating. For you are the ones who will have the job of "selling" the Training Institute to those you want to attend. You will also have to brief speakers and discussion leaders, and direct the training itself. Only if you are convinced of the importance of the Institute and sure of its intended objectives can you both hope to convince others to attend and make certain that the program runs smoothly.

The major goal of the Training Institute is to educate local officials and citizen leaders about alternative approaches to flood hazard management so that they may incorporate for their communities a range of community values including natural resource protection.

Specific objectives are:

- to provide participants with a better understanding of the NFIP as a starting point or framework for community flood hazard mitigation and to focus on the strengths and limitations of the NFIP;
- to provide participants with a greater understanding of the role which natural resources play in mitigating flood hazards;
- to provide participants with a greater understanding of the importance of public participation at key points in the decision-making process and to instill in them a commitment to become or remain actively involved; and
- provide participants with an opportunity to develop specific follow-up plans for activities which they intend to pursue in their own communities/regions in an effort to improve local flood hazard management.

These may seem like ambitious goals and objectives to accomplish in a 2-1/2 day or even a 3-1/2 day period--and they are. But as two test-runs of the Training Institute prove, this training program as designed can be highly effective in achieving these goals and objectives.

It's important that the Institute director clearly outlines these objectives at the beginning of the Training Institute, highlighting what participants will be expected to accomplish by the close of the Institute. Participants should be provided the opportunity to review these objectives, suggest modifications and ultimately adopt the modified objectives before proceeding with the Training Institute.

2. Preparing a Work Schedule

Once you are clear on the goals and objectives of the Institute your next step should be to outline the major tasks to be accomplished in preparing for the institute and to develop a time schedule for completion of those tasks. Be sure to allow sufficient time to accomplish the various tasks assuming that in most instances things will take more time than initially expected. Events such as staff turnovers, printing delays, or even natural events such as hurricanes or floods can seriously disrupt your planning schedule unless you build in adequate flexibility.

We estimate that the minimum lead time for planning an Institute of this sort is six months. We include here a model timetable (Figure 2) which outlines the major tasks you'll be expected to accomplish in preparing for a Training Institute. You may want to fill in additional details as you see fit.

3. Staff and Staff Functions

As was mentioned earlier, depending on the make-up of your organization, you will need to assign a minimum of two to three hard working staff to ensure the success of the training institute. Each of these staff will not need to work full time on the training institute for all six months, but they will each at some point need to give priority full-time attention to the institute. The way in which staffing needs will be fulfilled will vary from organization to organization. Normally, the staff will be comprised of an:

- institute coordinator;
- assistant coordinator; and
- a secretary.

The staffing functions will be:

- Substantive--as mentioned earlier, the accomplishment of the goals of the training program will depend on you and your staff's understanding of its goals and objectives. One key person (the Institute Coordinator) should have a deeper understanding of the substance of the training program. The Institute Coordinator will have a number of duties that should only be delegated to someone with adequate substantive knowledge to accomplish the required tasks. Some of these tasks will be:

  -- briefing speakers;

  -- coordinating steering committee activities;

Figure 2

MODEL TIME TABLE

Task	Month 1	2	3	4	5	6
• Develop time table and assign staff to specific tasks	X					
• Review relevant background material	X					
• Select regional steering committee members and send invitation materials (1st)	X					
• Hold (1st) steering committee meeting			X			
• Select site for Institute and make administrative arrangements		X				
• Revise Model Program based on steering committee comments.			X			
• Identify potential participants			X	X	X	
• Send invitations				X	X	X
• Hold 2nd steering committee meeting (optional)				X		
• Identify and invite potential resource people				X	X	X
• Follow-up on initial invitations with phone calls					X	X
• Send pre-Institute reading materials					X	
• Prepare workbooks						X
• Hold Institute						X
• Evaluate Institute						X

-- modifying the institute program and workbook to reflect steering committee suggestions; and

-- moderating the program.

- Administrative--the importance of the logistical component of conference organizing should never be underestimated. A number of administrative and organizing tasks must be accomplished before, during and after the conference. The individual responsible for administrative matters should not be the same person in charge of the substantive end of the program. Both jobs are too demanding and demands often occur concurrently. For example, the substantive person moderating the conference cannot at the same time be responsible for checking the rooms and audio visual equipment necessary for subsequent sessions.

Some of the administrative responsibilities include:

-- making all conference facility arrangements;

-- making certain that appropriate financial records are kept regarding registration fees and scholarship awards;

-- managing conference registration;

-- arranging for and checking on all special conference needs such as audio-visuals, easels, newsprints, markers, etc.

-- staying one step ahead of the program by making certain that facility arrangements work smoothly;

-- dealing with special problems participants have with rooming arrangements, meals, etc.

- Secretarial--good secretarial support is essential in conducting a training program of the sort described here. Secretarial responsibilities will include:

-- typing and mailing invitation letters and registration forms;

-- maintaining scholarship and registration records;

-- typing and getting printed participant program material, workbooks and lists;

-- mailing pre-conference materials to registered participants;

-- making certain that registration packets are complete and

-- assisting with the variety of administrative responsibilities described above.

4. Budgeting

A multi-state or single-state training institute of the type described in this manual will cost between $25,000-30,000.

The major cost categories are:

a. Administrative/Program Development costs ($15,000-20,000). Variables in this cost category include:

-- size of geographic area and resultant travel and telephoning costs;

-- salary level for staff, and overhead of organization.

Budget categories for the coordinating organization would include: staff, benefits, travel (including payments for steering committee travel), other direct costs (telephone, xerox, postage), and indirect costs.

b. Direct Conference costs -- vary between $7,000-15,000 for a single-state or multi-state organization. Budget categories include: scholarships for participants, travel, per diem, speakers' expenses, printing (workbooks, programs, name tags) renting audio-visual equipment.

Major variables in conference expenses will include:

- distances to be traveled;
- base cost of the conference facility (room and board);
- number of people invited needing scholarships;

If the conference is conducted in a smaller geographic area, costs may be even further reduced. Such smaller scale conferences will not only be subject to the same variables listed above, but will present an additional question of whether an overnight stay is in fact necessary.

5. Selection of Conference Facility

Selection of the facility for the Training I an important decision which can have a great impa ultimate success of the Institute. You should be reserve your facility very early in the planning good ones are often booked months or years in adv

When evaluating various possibilities, you w consider a number of factors including costs, cap and accessibility, conference facilities, and ame

Cost--room and board for participants will c major cost of the facility. Keeping the cost dow not only for your own budget but also in order to full audience you might seek. Under most circums scholarship payments will provide assistance for one third to one half of the participants. The r have to pay their own expenses.

We have found that conference facilities an usually willing to establish a special package th fixed price per person per day for room and boar and conference rooms. We have always used doubl the base price. Participants and scholarship re extra if they wish a single room. In the curren you will probably wish to limit your search to t which can offer you a rate of less than $50 per day for double occupancy. This is a reasonable not be prohibitive to those participants who'll own way to attend the Institute. Be sure to che to determine what costs are included in the per many cases, there are extra charges for coffee b rooms, bartenders, audio-visual equipment, etc., include these in their flat rate.

Size--You should, of course, limit your sea which can adequately handle the number of partic expect to attend. If your group is large, and t relatively small, you'll want assurance that you to compete with another group for space and staf If your group is small, you should select a faci will not dwarf the group but rather will provid environment which can enhance group dynamics.

Location--Another criterion to consider is and accessibility. Those facilities with the be usually located in the downtown of a major city a major airport. However, in most instances the facility will be too expensive and offer too man which could lure participants away from the sess other hand, an airport location might meet the but would not offer the type of attractive and ment conducive to this type of intensive Traini

We consider the optimal setting for this type of Training Institute to be a relatively remote facility located in a pleasant environment no more than a one to two hour bus ride from a major airport. Ideally, this facility might offer amenities such as a swimming pool, hiking or nature trails, etc. Although the program is tightly scheduled and will not offer much time for recreation, our experience has been that participants take advantage of the moments they do have and appreciate the opportunity to walk outside in a pleasant atmosphere.

You will want to evaluate the facility carefully and make certain it's isolated, with a pleasant environment, but without so many attractions that the location competes with the program. One of the pilot institutes was held in an historic small beach town, in a magnificent historic facility. Although the location was remote (one hour drive from a major metropolitan area) and the facility beautiful, it provided too many attractive alternative activities to the conference program.

Physical Requirements--The training program described in this manual is designed for 100-125 people. It contains a mixture of small and large group sessions. Some sessions use speakers, panels, roundtable discussions, and a variety of audio visual activities. Other sessions use case studies and maps, and are designed to foster small group discussion. The physical requirements of each element of the program are described in the detailed Lesson Plans, and are also addressed in Section C - Tips on Conducting the Institute.

Summarizing physical needs, however, you will find you need a variety of modern conference facilities. The conference facility must have modern lighting and acoustical features. In addition, it might ideally have available xerox capacity, audio-visual equipment, audio-visual assistance (in case equipment breaks) and easels with newsprint for small group sessions. If the facility does not have the appropriate audio-visual equipment and easels for small group sessions, you will have to rent them.

The minimum space needs for the program described in this manual will be:

- One large room for plenary sessions. Ideally this room should have a seating capacity of no more than 150 people, as you won't want your group to be dwarfed by the size of the room. If the conference facility is otherwise ideal, and you are willing to accept a larger room, you should arrange to rope off the extra space in the back of the room so that the participants will be concentrated up front.

We have found that auditorium style rooms with a stage and tiered seating can work very poorly as the large meeting room. That style room can create a sense of distance between panelists and the audience and discourage questions and dialogue from the audience. It is helpful to have panelists and speakers on the same level as the audience, with several microphones in the audience to encourage their active participation in sessions.

- Six or seven break-out rooms for small group sessions. At various points in the program, participants divide into small groups to accomplish a variety of purposes. The small group sessions are designed for no more than 20 people. Each break-out room should be large enough to accommodate 20 people comfortably. Occasionally you may find it necessary to use the large plenary room for one of the small group sessions. In that instance, you will wish to make certain that the group occupies only one corner of the large room and that chairs are arranged informally. To the extent possible, these rooms should be located in close proximity to the plenary session room. Given the tight program schedule you should try to minimize the participants' travel time between sessions.

6. Scheduling of Institute

The model training program we are proposing in this trainer's guide involves a 2-1/2 day time period. We find that in order to accomplish the goals of this program a certain dynamic interaction among participants must take place. This interaction begins at a low level on the first day. During the second day participants interaction increases, producing a high level of energy and enthusiasm. The third day can be viewed as a winding down period.

In scheduling an institute of this sort, it is important to realize that it takes a day for people to get to know each other and work together. It is equally important to realize that people will begin leaving and/or winding down two or three hours before the formal end of the program.

The program format described in this manual is very intensive and involves few breaks. It can be exhausting for participants. We have tried to intersperse a number of quite informal sessions to allow participants to relax. One of the pilot Institutes tested by The Conservation Foundation stretched over a 3-1/2 day period and involved an afternoon break one day and an evening break the next day. This may be desirable from a programmatic viewpoint, but will cost more money and will require more of a time commitment on the part of participants.

Using a 2-1/2 day program, there are a number of ways you might schedule the Institute:

a) three week days;

b) one weekend day and two week days; or

c) two weekend days and one week day.

It's up to you to select the schedule which you believe will best meet the needs of the majority of your participants. You may want to consult your steering committee (see page 24) on this before making a final decision.

Based on our experience, we would argue for option c - two weekend days and one week day. We recognize that weekends are special days and that people are reluctant to give them up. However, we also recognize that many of the participants you invite (particularly the local citizen leaders and local governmental officials serving in a voluntary capacity) have full time jobs unrelated to flood hazard management. Therefore, an Institute scheduled to include weekdays will require these individuals to take off from work in order to attend. We feel option c offers the best compromise and since it involves only one full weekend out of 52, we believe you shouldn't meet with too much resistance.

The program described in this manual can be divided into 2 to 2-1/2 hour modules and run for a local community over an eight or nine-week period. Sessions could be held in the evening to maximize attendance from the community. We would advise that such a training course be designed for no more than 30 people, breaking into two small groups when appropriate.

The advantages of such an approach are reduced travel and per diem costs, and improved ability to reach a larger group of people in a single community. The disadvantages may involve reducing the dynamic interaction among participants who would otherwise have been closeted with each other for a short intensive time period. Many participants may miss several sessions and not get as much out of the program. We have not yet tested this approach and if any of the readers of this manual choose to do so we would appreciate receiving comments.

B. PROGRAM DEVELOPMENT

1. Modifying the Model Program

The Institute program presented in this training manual is a model that has been revised after being tested in two different parts of the country, and with two slightly different formats. In many instances you will be able to use the program exactly as designed. In other instances, modification may be in order.

Some of the questions you will wish to ask in evaluating the model program's applicability to your situation are:

- How closely will the target audience from my state or region resemble the audience for which this program was designed?
- If the audience will differ from the planned audience, what are the programmatic implications?
- How sophisticated and knowledgeable is the audience in my state or region likely to be concerning the NFIP program or the relationship of natural resources to hazard mitigation? (Remember, if you are inviting only two or three carefully chosen people from targeted communities, they might be very sophisticated indeed!)
- What is the nature of the flooding problems faced by communities likely to attend the Institute?
- What is the nature of the natural resource base of communities in my region?

Depending upon how you answer these questions, you may wish to consider a variety of actions in modifying the program.

- We have often found it helpful to plan an optional pre-institute tutorial that takes place during registration. This pre-institute program may cover issues not addressed during the Institute, but which participants need to understand to benefit from the Institute. A pre-institute tutorial, as we have used it, is designed to help bring the audience to a basic common level of knowledge as they start the training program.
- You will wish to consider the range of alternative concurrent workshops offered by the program, dropping some workshops and adding others.

- You will wish to examine carefully materials prepared for the Institutes--case examples and maps--and determine if you need to develop materials that more closely reflect the flooding problems and natural resource base of your region. (Remember, the case examples and the maps are simply teaching tools that are used during the Institute. They need not exactly approximate the real life situation of communities in your region.)

The decision to make modifications to the model program must be made early in the training institute planning process. If major modifications are contemplated, you will have to devote staff time to revising the model student manual possibly including case materials and maps. You should make the modifications with the advice and assistance of a steering committee comprised of individuals who are both knowledgeable about flood hazard management problems in your region and representative of your target audience.

2. Steering Committee.

Selection of the Steering Committee is an important task, as this group serves as the major advisory body to you, the Coordinator. The Steering Committee will have major responsibilities both for identifying participants and resource people and for modifying the Model Training Program to best meet the needs of the geographic area represented at the conference (multi-state region, state, or community). If you've done a good job choosing your committee, the members should be able to provide you with valuable assistance throughout the planning period and can contribute significantly to the success of the Institute.

a. Selecting the Committee

Ideally, the Committee should include between 20 and 25 individuals. They should represent the broad range of interest groups and geographic regions you hope to attract to the Institute. Thus, you should be looking for bankers, insurance agents, civil defense agents, social service representatives, environmentalists, developers, planners, local officials, state officials, and FEMA regional officials. (See participant section - page 28 .) If you're conducting a multi-state or Regional Institute, you should ensure that the committee members represent fairly the various states involved.

You should select your committee members on the basis of several key criteria including: 1) representation of the constituencies and the geographic areas you are trying to reach in the training Institute; 2) familiarity with flood hazard management and/or public involvement in community environmental decision making; 3) willingness to invest considerable time and energy prior to the Institute helping you to identify potential participants and resource people and; 4) willingness to play a central leadership role both during and following the training Institute. When inviting these individuals to participate, stress the importance of their involvement and make sure they understand the level of commitment expected of them. The most active committee members are those who understand from the start and willingly accept their assignments.

An approach we recommend you consider in selecting your Steering Comittee is to first identify those 12-15 geographic areas (watersheds or coastal community clusters), which you would like to "target" for the Institute and then identify an individual in each of those geographic areas who could best assist you in identifying and inviting potential participants from that area. That individual might be an active environmentalist, a member of the League of Women Voters, a realtor, a professional staff member of watershed authority, etc. What is most important is that the individuals selected meet the general criteria mentioned in the previous paragraph and that they be able to identify and persuade key people in their area to participate at the Institute. These 12-15 individuals should also represent a balance of the various interest groups being targeted.

We offer no magic formula for selecting your steering committee members or determining an optional balance of interested groups. In some areas you may have to choose between several appropriate individuals representing different perspectives. In others you may discover one person who really stands out. Use your best judgment in selecting a group of people who you think can work well together and can provide you with essential assistance.

In addition to the 12-15 representatives of local communities, your Steering Committee should include the state FIA coordinator from each state being targeted, other prominent state-wide interest group leaders, and FEMA regional officials.

The Steering Committee may comprise as many as 25 individuals, including your staff. Although this may sound like an unwieldy size, we have found that it need not be, and that the need for the right representation on the Steering Committee overrides concerns about the size of the group.

Obviously, this approach to selecting a Steering Committee will require you to do some serious homework in advance. You will probably want to meet or talk with the FEMA regional officials, including the staff of the Insurance and Mitigation division, and the state FIA coordinator(s) to get their assessment of the 12-15 geographic areas which are most important to target. These officials may even be able to provide you with some initial names of potential Steering Committee members who live in these areas.

We have found that contacting the state League of Women Voters chapter is often a good starting point for identifying steering committee members, when no other names have surfaced. For example, a call to the State League of Women Voters Environmental Quality chairperson might turn up the name of a League contact active in civic affairs in a particular watershed. That person may not be the right person for your steering committee, but is likely to be able to recommend names of other active civic leaders who might be appropriate representatives.

Each person identified as a potential steering committee member should receive a formal invitation to participate on the committee even if you've already spoken with them over the phone. With the invitation letter you should include a brief fact sheet about the Institute, its primary goals and objectives, relevant background information, description of your organization, etc.

b. The Steering Committee Role

Once you've selected your Steering Committee, your next step will be to schedule at least one full-day committee meeting, at least 4-5 months prior to the Institute. You should schedule the meeting for a place convenient to the majority of committee members. If you're dealing with a large geographic region and the majority of members will be flying to the meeting, you might consider holding the meeting at the most convenient airport. This will reduce travel time to and from the meeting place and allow you more time during the actual meeting. On the other hand, if your region is small, you should select a meeting site which is centrally located and accessible by car.

The Steering Committee meeting is intended to accomplish a number of objectives, the most important being to provide members with an opportunity to buy into the program and make it theirs. A face to face dialogue will help to establish a cohesive force among committee members, and enhances the credibility of your efforts by making certain that the program reflects the needs of the audience.

Formal objectives which you will want to accomplish during your Steering Committee meeting include: (1) to explain the background and purpose of the Training Institute and the role of the Steering Committee members; (2) to obtain the input of committee members on regional goals and objectives and how these might be addressed at the Institute; (3) to identify (and perhaps modify) criteria for selection of participants and to develop a strategy for inviting potential participants; and (4) to review the model training program in detail, to suggest modifications and to identify names of possible resource people to serve as speakers, moderators, workshop leaders, etc.

Although this list of objectives represents a great deal to accomplish in a single meeting, it can be done. You must, however, ensure that the meeting begins on time and that any extraneous discussion is kept to a minimum. In addition, it will help if steering committee members understand what they are expected to accomplish at the meeting and come prepared with questions and comments.

We suggest that at least two weeks prior to the steering committee meeting you send a copy of the model training program to committee members. (The "Model Program Outline" included on pages 5-10, or something similar would be appropriate.) You might also want to send them additional reading material such as the Resource Manual or summary papers. Encourage committee members to read these materials carefully and come to the meeting prepared to discuss them at length.

You will want to be certain the meeting begins with a discussion of the goals of the program and then quickly moves to an examination of participant selection criteria. You should never allow a discussion of the program before addressing and completing the previous two issues, since the program content cannot really be understood unless people clearly understand the goals of the training institute and the audience to which it's directed.

Your agenda might be organized in the following manner:

1. Goals/Purpose (1 hour)
    - your presentation of overall objectives;
    - committee listing of their goals; and
    - discussion.
2. Participant selection (1-1/2 hours)
    - individuals; and
    - communities.
3. Program (2 hours)
4. Resource People (1/2 hour)
(Discussion to be followed up by phone conversations.)
5. Follow-up role of Steering Committee (1/2 hour)
    - submit lists of potential participants who meet selection criteria;

-- recommend appropriate resource people for various sessions; and

-- participate at Institute, serve as speakers, resource people, discussion leaders.

Some of you may want to consider holding two Steering Committee meetings; one very early in the process to introduce the overall goals and objectives and to discuss participant selection, and another four to six weeks later to discuss the model program in detail. This may be a desirable option if your region is small (meaning travel time and costs are relatively small) and your committee members are willing to commit two full days to meetings. Those of you planning an Institute for a large geographic area, however, may discover the time and costs associated with organizing two meetings outweigh the benefits.

Speaking of costs, you should be prepared to cover the travel and room and board costs of those Steering Committee members who have no alternative means of financial support. At a minimum, this will include your citizen representatives and probably any local officials. If state agency travel budgets are tight, you might have to cover some of these expenses as well. Most business and industry representatives and federal officials should be able to cover their own expenses.

You might also want to offer some of your committee members a small consultant's fee ($100-300) to perform certain tasks, such as actively inviting qualified individuals in their area to attend the Institute. A personal invitation extended by one of your Steering Committee members is likely to be far more effective than either a letter or a phone call from you (unless, of course, you know the person). Thus, this approach of actually paying Steering Committee members to carry out some of your responsibilities might be a cost-effective measure, particularly if you're dealing with a large geographical area.

3. Participant Selection.

Perhaps the most difficult but also the most important task you'll undertake in planning for this Training Institute is that of identifying and inviting participants. You should get significant help from your Steering Committee, but you should be prepared to present them with a well developed strategy and essential guidance before putting them to work.

a. Target Communities

Your first step in selecting participants will be to identify those 20-25 communities which you want to "target" for your Institute. If you adopt the strategy we suggest for identification of Steering Committee members, the geographic areas (watersheds or coastal community clusters) will have been selected by you before the Steering Committee meeting with the assistance of appropriate FEMA and state agency personnel. Yet, within each geographic cluster, there will remain a number of choices concerning which communities to target. A given watershed, for example, may contain 50 to 100 communities.

You will wish to target communities that you and your Steering Committee believe will most benefit from the Training Institute, and which can play a key leadership role in their geographic region. We suggest several criteria for selection of target communities, including:

- enrollment in regular phase of NFIP (or about to enter the regular phase);
- population of 10,000 or more;
- experiencing significant growth pressures;
- containing considerable amount of existing developable land in flood hazard areas;
- experienced recent flooding problems (perhaps received a presidential disaster declaration);
- in the case of a riverine community, shares a drainage area (watershed) with other communities which might be participating at the Institute; and
- in the case of a coastal community, shares development pressures with other communities attending the Institute.

These criteria are not intended to be hard-and-fast rules. Circumstances differ across the country. One of the tasks of your Steering Committee will be to evaluate target community criteria to see if modifications are appropriate. In your area for example, only a few communities might meet the size criterion of 10,000 people. Or if you are in a coastal area, you may discover that a community has not recently been flooded, but is a prime target for a major hurricane disaster. It's your job, working with the Steering Committee, to modify these criteria to best fit your regional situation.

Recognizing that it's extremely unlikely you'll be able to attract all of the 25-30 target comunities which represent your first choice, we suggest you compile a secondary list of 15-25 communities which also meet your general criteria. You may choose to invite participants from this back-up list as some on your primary list drop out.

b. Identification of Participants

Once you've identified your target communities, you can begin the process of identifying and inviting participants from those communities. At this stage you should be able to rely heavily on your Steering Committee to provide you with names from a particular locale.

Criteria which you and your Steering Committee should consider when selecting community representatives include:

- individuals who have a constituency, formal or informal, back to which they can take information obtained at the institute;
- individuals coming from a variety of diverse constituencies within a community; i.e., environmental, civic, governmental, business, etc.;
- individuals who are actively involved in their communities and who have a demonstrated capability to disseminate information in a locality; and
- individuals who indicate a commitment to pursuing follow-up activities after the Institute.

If possible, you should try to get a minimum of two to three people (what we consider a critical mass) from each community who meet these criteria and also represent different interest groups --local government (elected or appointed officials), citizen groups, environmentalists, Red Cross volunteers, and business (developers, insurance agents).

In examining the criteria for target community selection, it may occur to you that several can be inherently contradictory. For example, a community which has experienced recent flood disaster may have an almost completely developed floodplain. It may be that the only opportunities for flood hazard mitigation are relocation or some sort of structural protection. Yet, those communities experiencing growth pressures, with some significant part of the floodplain still undeveloped (and, therefore, with the greatest opportunity for implementing non-structural flood control measures) may not have experienced a recent flood disaster with the accompanying heightened awareness of the need for new approaches.

This training program is designed to address both corrective and preventive non-structural flood hazard mitigation strategies. Some of the greatest opportunities will arise, however, in communities that have either not yet developed, or are just starting to develop, their floodplain. For the reasons described above, your job in attracting participants from those communities may well be a selling job.

In order to get commitments from two to three individuals in each community, however, you will probably have to invite anywhere from five to ten people. Locating those five to ten individuals will require considerable energy and some creative thinking. To make your job easier, you should make a list of all those types of people who presently have an interest in community flood hazard management and those who might be interested if the issue were presented in relevant terms. Our initial attempt at a list looks like this:

Interested

- Local officials
- Civil Defense officials
- Volunteer disaster response groups
- Planners
- Residents of flood hazard areas (if they perceive a real danger)

Might be interested

- Environmentalists
- Bankers
- Insurance Agents
- Realtors
- Developers
- Residents of flood hazard areas (who haven't experienced a serious flood)
- Taxpayers
- Recreationists
- Educators

As you can see, the list of potentially interested groups is larger than the list of groups which traditionally express an interest in community flood hazard decision making. You probably won't have too much difficulty convincing people on the first list that the Institute will be relevant for them. However, you may have to expend considerable time and energy persuading people from the second list that it will be worth their time (and in some cases money!) to attend.

We suggest that you spend some time thinking about the groups on the "potentially interested" list and what reasons you might propose to convince them it's worth their time to attend. Compile a list of reasons for each group and perhaps test it out on your Steering Committee.

For example, environmentalists are concerned with protecting natural resources such as wetlands, barrier islands, dunes, wildlife areas, etc. Many of these natural resources, if protected, also serve hazard mitigation functions. Your focus in communicating with environmentalists might be to highlight this link between natural resources and hazard mitigation and explain how the training institute will address this issue. For the bankers you may wish to stress the risks associated with mortgages on properties located in flood hazard areas which aren't adequately regulated. With taxpayer groups, you may stress the hidden costs of police, fire and emergency services, and damages to public infrastructure which taxpayers incur in the event of a flood. And with civic groups you may wish to stress the human costs of the post-disaster period.

c. Scholarships

Many individuals may not be able to attend the Training Institute without some form of financial assistance or scholarship. This applies particularly to local citizen leaders who are already being asked to give up at least one work day for the Institute and have no alternative resources. Local offici many of whom are volunteers or who operate on shoe-string budgets, may also require financial assistance. Because the participation of these individuals is essential to the success the Institute, you should be prepared to offer full or partial scholarships to as many of them as possible. Businessmen--realtors, developers, bankers, etc.--generally can write off the Institute expenses as a business expense. Therefore, except under unusual circumstances, we suggest you reserve the scholarship funds for those in other categories.

If you are planning an Institute of 100-125 people, we suggest you set aside sufficient funds to cover the room, board, and travel expenses of approximately 50 people. (For a smaller conference you should allocate a smaller number of scholarships). Based on a per diem rate of $50 and depending on the size (hence the travel cost) for your region, your scholarship budget could range from $7,000 to $14,000. You might stretch these funds to cover more people by offering partial scholarships, encouraging car pooling, etc.

Participants to whom you wish to offer scholarship funds should be notified in the initial letter of invitation that scholarships are available. You might encourage participants to contribute as much as they can, but make it clear that thei attendance is important and that you will make every effort to cover full costs if necessary.

d. Invitations

Having compiled a list of five to ten individuals in each of your 25-30 target communities who meet the general criteria, as well as a list of other state or regional people you'd like to invite, your next step is to issue letters of invitation. These letters should go out at least three months prior to the Institute. In some instances, those you're inviting will already have been contacted by a Steering Committee member to determine their interest. In other instances, they will know nothing about the Training Institute. In either situation the invitation letter should clearly outline; 1) the purpose of the Institute, 2) where and when it will be held; 3) why the individual has been selected; 4) why it's important that he/she attend; 5) what the registration and room and board costs will be; and 6) what you expect from them (i.e., when you want them to let you know if he/she's coming.) Be sure you enclose a registration form.

Included in Appendix A, attached, are sar letters and Registration Forms which you might for your own purposes.

Rather than sending a standard letter to (which we recognize is easier), we suggest yo for each of the major interest groups (local nessmen, environmentalists, etc.) including f letter a paragraph which highlights how flood and the Training Institute are relevant to th group. You will also want to send a slightly to those you expect to request scholarships, procedures and including the application form these modifications mean extra work for you a believe your efforts will be rewarded. We su order to maintain some control over the numbe attending, you consider some of the following

- State a registration cut-off date to registration (e.g., "registrations wi in order of their receipt--on a first served basis" or "no registration wil after December 1"). Also to encourag announce a date on which pre-Institut materials will be mailed and specify must be received before that date.

- If you want to avoid handling money a specify that only advance, mailed reg panied by full payment will be accept

- State that checks be made out to your

- If appropriate, say "no partial regis accepted."

- Also be sure to specify rules for ref registration cancellation) in the ins "requests for refunds received before be honored in full. No refunds can b to requests received after xx date.")

- If the conference is by invitation on don't want the invitation passed on t so specify. If you want the invitee the entire conference period, or else that also should be made clear in the instructions.

- Along with registration information, provide information on accommodations. If the conference is to be held at a special facility where room and board are included and participants are expected to stay on the grounds, say so specifically. When appropriate, also say that many of the rooms are doubles. Provide a space on the registration form for people to indicate preference for a single room or a specific roommate.

- For more traditional conference facilities in standard hotels, explain clearly in the registration information how reservations will be handled. You should make arrangements for the group with the hotel, and then make each participant responsible for his/her own reservations through direct dealings with the hotel. This helps avoid headaches and unnecessary charges (for no-shows, etc.) to you. In the registration form, provide clear instructions on necessary procedures (cut-off dates for reserved block of rooms, etc.) and a hotel reservation form if possible. If the conference is being held at a particularly nice place, include a brochure describing it.

You might also consider including in the invitation letter a basic fact sheet on flooding problems in your region. This fact sheet, which you should compile with assistance from FEMA Regional Office and/or state FIA Coordinator, ought to include data on the number and frequency of floods over the past 50 years, number of lives losts, value of property damaged, public expenditures (Federal, state and local) for flood disaster response and recovery as well as other pertinent facts. This sheet could serve to dramatically highlight the real dangers of flooding in your area.

e. Follow-up Correspondence

Once the invitation leters have been sent, you should send a copy of the full invitation list to your Steering Committee members indicating which individuals are located within the particular geographic area (state, watershed, county) which the member represents. Ask your Steering Committee members to follow-up on these individuals with phone calls approximately two weeks after the letters were mailed. When calling, they should first check to be sure the letter arrived. Then they should find out if the invitee has any question and if they're planning to attend. Encourage your Steering Committee members to be as persuasive as possible. The job to be accomplished at this point may be a selling job, but if the invitee seriously isn't interested or has a legitimate reason why he/she won't be able to attend, ask them if they could suggest other possible invitees. Give Steering Committee members a week to make these follow-up calls.

If you don't hear from your Steering Committee members within a reasonable period, check to see what progress they've made. Don't assume just because they're nice people and appear interested that they in fact will complete their assignments. After all they're human too and subject to the same distractions that we all face despite their good intentions. If you discover that some of your Steering Committee members have not completed their assignments, find out why and if there is any way you can help them. It may be they've overextended themselves and simply can't find the time to make the calls. If these individuals are volunteers, you may decide it's easier just to make the calls yourself. However, if you've agreed to pay these members for their services, you have a right to expect more from them and should insist they follow through.

The more helpful your Steering Committee is, the fewer phone calls you will be required to make. However, you should always assume that you and your staff will spend a substantial amount of time on the phone.

A month after the first invitations have been extended, you should have a good sense of how successful you've been in attracting participants. Based on the early results you should decide at this junction whether or not to extend additional invitations to individuals from communities on your fall-back list. When in doubt we suggest you send out the second round of invitations making it clear to invitees that acceptances are made on a first come first served basis. This approach will better insure that you will attract the desired number of participants at the Institute and if in fact you discover that you're liable to be over registered, you'll have a legitimate excuse for turning the late registrants down.

4. Resource People

a. Selection

The selection of appropriate resource people to play a role during the various Institute sessions is another task where Steering Committee members can be most helpful. If you glance at the model program, you'll note that the program calls for a large number of resource people. Although it may seem tempting to use many of the same people in several slots on the program, we would caution against "over-using" any particular resource person. First, it's not fair to the individuals--even though they initially consent to sit on three separate panels, they may find themselves exhausted and resentful once the Institute is underway. Second, it's not fair to the audience--most individuals will represent a fairly narrow perspective and it gets boring to hear it repeated for the third time.

Use your first Steering Committee meeting as an opportunity to get members' suggestions for possible resource people. Some of the key resource people such as speakers and workshop leaders you should be able to identify at least three to four months prior to the Institute. Prominent individuals have busy schedules which fill up quickly. Therefore you should try to tie these individuals down as early as possible. Don't overlook your Steering Committee members. Most of them could serve as resource people in a number of slots.

You will probably also want to select some of your resource people, particularly panel members representing local perspectives, from the list of registered participants. So you may decide to wait a bit longer to fill some of these slots. However, you should try to have your list of resource people fairly well set at least three months prior to the Institute, recognizing there will inevitably be last minute changes.

The criteria to use when selecting resource people will vary somewhat depending on the role you want them to play. A brief discussion of these is included here. (Refer to page 48 for a more detailed discussion of the various types of sessions and resource people required.)

Speakers. Look for individuals who are not only well respected in their field but more importantly known to be good public speakers - individuals capable of speaking "English" to a lay audience. A fancy title or impressive reputation is not enough to keep participants interested. You also want someone who's willing to limit themself to the specific time and topic scheduled for that period.

Panel or Roundtable Members. These individuals will be expected to represent one of a range of perspectives on a particular topic. Therefore, they should be individuals familiar with the topic and capable of succinctly and spontaneously representing their perspective.

Moderators. A good moderator is essential to the success of a panel discussion. These individuals should be very familiar with the topic of the panel and cognizant of the key questions which the panel should address. They should be individuals capable of maintaining a low profile (you don't want your moderator giving a speech) but also assertive enough to cut off a long winded panel member or to redirect discussion when it has gone off track. When the panel is structured as a roundtable discussion, it is particularly important that the moderator be substantively knowedgeable. The success of the roundtable format depends upon the ability of the moderator to pose the right questions at the right time.

Workshop Leaders. The success of any small group session (workshop) depends almost entirely on the workshop leader. This individual is the one responsible for introducing and closing the session, keeping track of time, encouraging full participation of all group members, and ensuring that major goals of the discussion are accomplished. (These responsibilities are described in more detail on page 35.) Individuals serving as workshop leaders should have considerable experience working with small groups and preferably be knowledgeable about the topic of discussion.

As you'll note in reviewing the model program, some of the workshops call for a mini-lecture or presentation by a knowledgeable resource person followed by a group discussion. If at all possible, we recommend that the designated workshop discussion leader for these sessions be someone other than the resource person. This will make it easier to keep the presentation brief and the discussion on target.

However, if you run short of qualified discussion leaders or otherwise decide to assign the resource person as discussion leader for these sessions, we urge you to brief them thoroughly on the purpose of the session and their role and responsibilities as discussion leader.

b. Invitations

As was mentioned earlier, the majority of resource people should be invited as early as possible to ensure that they reserve your dates on their calender. The initial invitation letter which should be as personalized as possible, should describe the general goals of the Institute, when and where it will be held, who will be invited, what the program will cover and what role specifically you want them to play. Let them know that a more detailed briefing package will be sent to them later should they accept the invitation. (A sample invitation letter is included in Appendix A.) Along with the initial letter, you should send a brief summary of the program and a more detailed fact sheet on the Institute. Also include all the registration materials sent to participants. Early on you should request they send you a biographical sketch and an indication of what kinds of audio-visual equipment they may need.

c. Briefing

At least a month in advance of the Institute, you should send all resource people a Briefing Package which describes their role in more detail. In this memo you should include information on: (1) the format of their session, (2) the specific goals and objectives of their session, (3) how their session is intended to fit into the overall program, (4) what kind of audience (size, composition, level of sophistication) they will be working with, (5) major questions to be addressed, (6) other resource people serving in the same capacity; and (7) any other information you think is relevant. Samples of briefing memos are included as guidance in Appendix A.

A most important part of briefing speakers will take place in person just prior to the Training Institute. You should plan on scheduling a 1/2 day meeting with major resource people immediately preceeding the Institute. (You may wish to schedule breakfast or luncheon briefings during the Institute with persons playing relatively minor roles in the Institute.) The half day meeting should begin with a complete description of the goals and the objectives of the Institute and the manner in which different parts of the program fit together to accomplish these objectives.

Depending upon your available staff resources you will then wish to break into several separate groupings, each of which will focus on a specific part of the program. For example:

- The participants in the opening roundtable discussion should be given an opportunity to see the film, and develop a strategy to bring out major points for discussion (see Lesson Plan No. 2).
- Facilitators of specific small group sessions should explore ways to help those sessions accomplish required goals. You should plan to discuss with these workshop leaders:
  1) The specific goals and objectives of their session;
  2) The materials you want them to use (maps, case studies, etc.);
  3) Specific procedures you want them to follow (use of exercises, slides, brainstorming); and
  4) Products you expect from the workshop.

The detailed lesson plans, which follow this section of the manual, provide guidance on how to conduct each session, as well as points you should make in briefing resource people. You might even consider staging a trial run of some of the informal sessions in order to give workshop leaders a clear idea of how you want them to conduct the session and what you want them to accomplish.

d. Funding

You should be prepared to pay for the room, board and travel expenses of those resource people who indicate they'll need financial assistance. Given the large number of resource people required by this program, your speakers' expenses could be very high. To stretch your travel budget as far as possible, try to select resource people from within the region. Keep in mind that most Federal and state officials have travel budgets that can cover at least some portion of their expenses. Encourage them to use their resources, pointing out the limited nature of your scholarship funds. However, if a key state official is truly unable to attend without financial assistance (e.g., no out of state travel funds), you may decide he's/she's important enough to fund.

Only in extremely rare situations should you agree to pay resource people an honorarium. These additional costs could quickly strain your budget and in most instances you should be able to find another qualified individual who is willing to participate without receiving any fees.

5. Pre-Conference Mailing

A pre-conference mailing should always go to registered participants 10-14 days before the scheduled meeting. This mailing first serves to confirm to the participant that their registration has been received and that they are expected at the conference. Included in this mailing should be:

1. An updated--or final--conference program providing full information on speakers and exact time and location (designated room) for each program session. On the conference program, be sure names and titles of speakers, moderators, etc. are spelled correctly. When in doubt, make a call or check correspondence. Where several people are listed together (panelists, etc.), list them in the order of their presentations, if possible. If that isn't settled when the program is printed, list in alphabetical, rather than arbitrary, order.

2. An alphabetical list of participants registered (include speakers, moderators, etc.) as of a certain date. Unless circumstances dictate otherwise, it's safest to use no titles (Mr., Dr., or Ms.) on lists --just full names with correct, official titles on the next line. If you do use titles, be sure you call all Dr.'s "Dr.," and use either Miss and Mrs. or Ms., not Ms. and Mrs.

3. Biographical summaries of conference speakers, moderators, etc. (or of all participants, if it's a small working group) in alphabetical order.

4. An information sheet, describing how telephone calls will be handled and providing the conference phone number and address; relevant information on transportation options to the conference site and parking availability and cost (include a map of routes to the site or to parking places, and/or a floor plan of the conference site, if that seems useful). Mention appropriate dress, particularly if the site isn't a standard hotel or office building.

5. Substantive background materials--including The Community Action Guide Summary (Appendix I), accompanying study questions and any other relevant information.

6. Training Materials

The Conservation Foundation has prepared a series of training materials to be used in conjunction with the Training Institute. These materials include:

- Resource Manual entitled "Flood Hazard Management and Natural Resource Protection: Community Action Guide";
- Summary of the manual entitled "Flood Hazard Management and Natural Resource Protection: Community Action Guide Summary" (Appendix I);
- Model Student Manual; (Appendix G, H)
- Mapping Exercise for small group sessions entitled The Nature of Flooding and the Special Role of Ecological Resource in Flood Hazard Mitigation, Lesson Plan No. 5 (Appendix B);
- Slide presentation entitled "Flood Hazard Management: Three Stories," (Script, Appendix C); and
- Simulation/game entitled "Planning for Acts of God and Nature" (PAGAN) (Appendix E).

We describe each of these elements in detail in this section to give you a good sense of how they might fit into the overall Training Program you ultimately design.

a. Resource Manual. This approximately 300 page document addresses in detail the major issue relating to community flood hazard management and natural resource protection. Topics addressed include the nature of flooding and flood hazard management, Federal role in flood hazard management highlighting the NFIP and the floodplains Executive order, the role of natural resources in mitigating flood damages, community strategies on managing flood hazards, legal and institutional considerations of flood hazard management and public participation in community flood hazard management programs.

The manual is intended as a comprehensive guide useful to community leaders (not the general public) interested in designing or refining their community's flood hazard management program. The resource manual is generally handed out at the Institute to be used by participants upon returning to their communities. The manual is carefully subtitled and indexed so that the reader can locate subjects of interest easily. We suggest that you, as the Institute coordinator, read this manual thoroughly. At various points during the training program you should be prepared to point out sections of the manual that provide additional information. The manual is available from your FEMA Regional Office.

b. "Community Action Guide Summary". This shorter piece (approximately 75 pages) is a summary of the information presented in the Resource Manual. It is intended to be used by participants as background reading material in preparation for the Training Institute or by other individuals desiring a quick overview of the major issues. We hope that if the participants read this material carefully, we may better ensure that our diverse audience begins the program with a common level of knowledge. This booklet is generally mailed to participants two to three weeks prior to the Institute along with a staff list of study questions. Participants should be encouraged to read the materials and to know the answers to the study questions before arriving at the Institute.

A copy of the "Community Action Guide Summary" is included in Appendix I.

c. Model Student Manual. This manual is used as the Institute workbook and is essentially an annotated version of the Training Program intended to be the participant's primary working guide throughout the Institute. It includes background information on the Institute sponsors, a summary of the program, a detailed version of the program (color coded by day), review questions with space for notes following each session, exercises, case study materials, relevant charts, and a glossary. (See Appendix G, H)

Because it is only a model, you will want to modify the workbook to reflect your particular program as well as include additional information you feel would be useful for participants. For example, you might want to include a bibliography of key resources, list of agency contacts, biographies of speakers, etc.

It is your responsibility to reproduce the workbook. You should wait as long as possible before doing so in order for the workbook to reflect last minute program changes. However, don't wait too long--the workbook is a vital element in the Training Program.

d. Mapping Exercise Materials. Two sets of maps and related workshop materials (one for the Coastal Institute and one for the Riverine Institute) have been developed for the Institute sessions entitled "The Nature of Flooding in Coastal/Riverine Communities and the Special Role of Coastal/Riverine Ecological Resources in Flood Hazard Mitigation." Each set of materials includes: (1) actual USGS quad sheets from a specific geographic area, (2) mylar overlays depicting soils, current land use, current zoning, flood hazard and wetlands information; and (3) workshop handouts which provide participants with detailed information about the maps and how to use them. Copies of these materials are included in Appendix B of this manual. Additional copies are available from FEMA, Division of Training and Education.

e. Slide Presentation. "Flood Hazard Management: Three Stories" is 17 minute slide tape presentation which focuses on three communities (Montgomery County, Texas; Baltimore County, Maryland; and Sanibel Island, Florida) exploring their individual solutions to community flooding problems. Although presenting a great deal of factual information, the presentation also functions as an inspirational piece illustrating what can be done when a community is truly committed to resolving problems.

In the model program, the slide presentation is scheduled to be shown on Day Two at 8:30 in the morning. We suggest you review the slide presentation early in the Institute planning process. Copies are available from your FEMA Regional office. (Refer to Lesson Plan #6 for detailed discussion of slide show equipment needs, etc.; the script is included in Appendix C.)

f. Simulation/Game. Planning for Acts of God and Nature, PAGAN, is a 3 hour simulation exercise designed to model a community flood hazard decision-making process. It comes in both a coastal version and a riverine version and can accommodate anywhere from 6 to 150 players. Participants are assigned to various roles and then asked to make decisions concerning the desired level of flood protection in their particular community. Community descriptions and role descriptions are provided as part of the game. (See Appendix E)

The simulation exercise is suggested as an optional element which you might include if you decide to expand the program. Or you might want to use it during a one day follow-up session to the Training Institute. It works best with participants who have a solid background in community flood hazard management, so we advise that you not use it in the 2-1/2 day version of the program unless you have a fairly sophisticated audience.

7. Pre-Institute Checklist

There are certain items which you should be sure are in order before the Institute gets underway. Be sure to check the Lesson Plans for each session carefully to determine exactly what kinds of audio-visual equipment and other materials you'll need. Following is a partial check list which you should review and possibly add to when making last minute preparations.

- Movie--you may need to reserve in advance. Be clear on who's responsible for bringing it to the Institute.
- Movie projector--can the conference facility provide one or should you rent one? If the facility is providing one, check to be sure it's available and in good working order as soon as you arrive.
- Movie screen.
- Slide projector with tape unit. Can the facility provide it or should you rent one?
- Slide presentation and audio sound tape--be sure to order it from FEMA well in advance.
- Additional slide projectors, overheads, easels, etc. for workshop leaders--check with each resource person at least a month in advance to determine what specific audio-visual equipment they'll need.
- Extension cords--again does the facility provide them or shall you bring a few extras?
- Newsprint (enough for all the workshops).
- Magic markers (dark colors), tape, push pins.
- Name tags with participants' names and affiliations.
- Extra name tags.
- Typewriter.
- Extra copies of Pre-Institute reading materials.
- Evaluation questionnaires.
- Maps or other materials to be used in workshops.

- Workbooks.
- Resource Manuals.
- Information materials on your organization.
- Signs listing titles of workshop sessions to post at the entrance to the rooms.
- Signs for speakers/panel members.

8. Registration

You should arrive several hours in advance and make certain all materials and equipment sent to the facility have arrived. This final check of the facility is important. Conference facilities have been known to switch rooms at the last minute; or to schedule a rock concert in the room next to yours! (Believe us--it's happened!) Pre-check all of the rooms. Make certain they are set up several hours before you need them. And make certain you won't be dealing with unacceptable competition for participant attention.

The Registration desk should be set up at least two hours before registration is scheduled to begin. Be sure the space is adequate to accommodate wastebaskets, typewriters, registration materials, training manuals, promotional literature, etc.

- At the registration desk, keep a list or index file of all pre-registered participants, noting whether or not they've already paid and if they've received any scholarship award. Be prepared to collect some registration fees at the door and have appropriate receipt forms if necessary.
- We suggest that you hand out meal tickets or devise some other "fool-proof" method of keeping accurate count of how many meals are eaten at the Institute. This is one place where costs could get out of hand --since spouses, extra Federal or state agency people, etc., may not think to register at the beginning.

9. Institute Evaluation

An important element of conducting training programs which is too often overlooked is that of evaluation. Not only is it nice to get some direct positive feedback on what a great job you did, but it's also good to get some constructive criticism. After all, if you intend to stay in the business of conducting training programs, you'll want to know what techniques work best and which ones are less effective.

Included in Appendix F is a sample Evaluation Form which shouldn't take the participant more than 10 minutes to complete. Many of the questions are simple check offs which are quick and also easy for you to tabulate. The evaluation also includes a series of open-ended questions which allow the participant to be more thorough in his/her comments.

We suggest that you set aside a definite time (1/2 hour) at the end of the Institute to allow participants to fill the forms out before they go home. This is the best way to ensure an adequate return. Some participants, however, may prefer to spend more time with their evaluation or have a night to "sleep on it" before writing their comments. Therefore, you should provide stamped self-addressed envelopes so these people can send their evaluations to you after the Institute.

During the final sesion you should also provide participants with an opportunity to give verbal feedback on the Institute--what he/she learned, what improvements could have been made, etc. This step increases participants' sense of "ownership" of the program and may also provide you with some immediate and well-deserved praise.

10. Post-Institute Follow-Up

Following the Institute there are a number of additional small tasks you'll want to complete before considering your job to be over.

First, you should send thank you notes to all those various resource people and steering committee members who contributed to the Institute. These letters can be brief but should express your appreciation for the considerable time and energy they've invested in making the Institute a success.

Next, you should tabulate the results of the evaluation. The results will not only be of interest to you but many of the participants as well. Finally, you may also want to send a post-Institute mailing to all registered participants providing them with brief wrap up of the Institute. This mailing might include:

- Updated list of all registered participants;
- One to two page summary of the evaluation results; and
- Summary of the follow-up plans developed at the Institute.

C. TIPS ON CONDUCTING THE INSTITUTE

In addition to the myriad of organizational and programmatic details associated with planning this type of training institute, we feel it's important to note some key aspects of actually conducting the Institute. These include: 1) role of the Institute Director; 2) function and format of various Institute sessions (plenary sessions, small group discussions) including the special roles and concerns of moderators and workshop leaders during Institute sessions and optima room arrangements for various types of sessions.

1. Role of the Institute Director

As we mentioned earlier in our discussion of staff and staff functions, you or someone from your staff will have to take responsibility for actually running the Institute. This person, who will essentially play the role of master of ceremonies throughout the Institute, should be someone who: 1) thoroughly understands the program; 2) is comfortable and effective working with large groups; 3) is willing and able to keep the program moving on a tight time schedule; and 4) is capable of making a creative last minute adjustment to the program if called for.

Although the Institute Director may be someone other than the Institute Coordinator, he/she will frequently be the same person. The Institute Director may have additional responsibilities for briefing speakers and group leaders before the Institute. In briefing speakers the Institute Director will want to keep the following objectives in mind:

- Each speaker, moderator, or small group leader must thoroughly understand the objectives of the Institute and the manner in which his or her part of the Institute helps meet that objective.
- Each speaker, moderator, or small group leader must thoroughly understand the objective of his or her part of the program, including any products expected as a result of the discussion.
- Each speaker, moderator, or small group leader must thoroughly understand the format, structure and time allowance for his/her part of the program.

2. Function of Various Institute Sessions

In the next section, entitled "Lesson Plans", you will find a detailed discussion of each Institute session with its specific objectives, format, scope and requirements carefully outlined. However, before getting to that level of detail,

it's important that you first understand the overal
tion of the Institute program as we've designed it
function of various types of sessions in the overal

The structure of the Institute program procee
logical progression. If you analyze the program,
that the flow of issues addressed is as follows:

Flooding
Problem

↓

Goals for Resolution

↓

Natural Resource Solutions

↓

The Federal and State
Framework for Problem Solving

↓

Alternative Local Strategies for Problem So

↓

The Role of the Public

↓

Community Decision Making: Tradeoffs

The individual components of the program have
designed with the fundamental assumption that peop
more when actively participating in their learning
when passively absorbing information. We have, th

- Incorporated as few speeches as possible i
  the program design;
- Kept speeches short;
- Provided opportunities--even in plenary se
  for active discussion of issues;
- Provided a number of small group opportuni
  participants to reinforce their learning b
  to use.

a. Plenary Sessions

Speeches: As you'll note, we've included very few speeches in the model program. We feel that except in rare instances, speeches tend to be boring and are, therefore, a relatively ineffective teaching mechanism. In those sessions of the model program where speeches are called for, we recommend that they be limited to 20 minutes. Any longer than this and you'll risk losing most of your audience to day dreams.

It has been our experience that most speech subjects that are manageable in scope can be boiled down to a succinct time period. Requiring speakers to stick to a 20 minute time period will require them to think through ahead of time what the most important points are. The most interesting and useful information usually comes out in the question and answer period following the speech.

As was mentioned earlier, in selecting a speaker, you should look for someone who not only has the substantive knowledge but can convey the key points you want him/her to make in an organized and interesting delivery.

When a particular speaker is recommended to you, you will want to question several people who have heard that person address large audiences. You will want to know:

- Does the recommended speaker leave technical jargon aside?
- Does the recommended speaker know how to distill major points from a complex subject and present them succinctly?
- Will this potential speaker stick to a 20 minute time limit?
- Is the speaker entertaining and lively?

Roundtable Discussion: A second format we've used in plenary sessions (sometimes in combination with a speech) is the roundtable discussion. The roundtable, like most panel presentations, is designed to explore a diverse range of perspectives on a particular topic. However, we believe the roundtable can be a far more effective means than traditional panel presentations to achieve this end.

Panel presentations, most of which involve four to five individuals each delivering a 10-15 minute speech, can be terribly boring. Interesting or important differences in perspectives between members of the panel are often lost during the transition from one presentation to the next.

In contrast, the roundtable sessions used in this institute are designed to involve panel members in a discussion with each other and the audience of critical questions posed by a moderator. When done properly, the roundtable discussion can produce a lively exchange of views, far more interesting to watch than a series of short speeches.

At least two weeks in advance, members of the roundtable should receive a list of the general questions to be addresed during their session. They should be discouraged from drafting any prepared responses to these questions, however, since the moderator will be modifying the questions in order to elicit more specific answers.

One of the functions of the roundtable format we suggest for this Institute is to involve the audience in asking the questions most relevant to them on the topics addressed. We normally suggest a format for the roundtable that involves:

- A brief speech or film that lays out the issues to be addressed by the roundtable;
- The speaker takes no questions, but sits with the panel who, along with the speaker, respond to moderator and audience questions;
- The moderator then proceeds to address several questions to different members of the panel (including the speaker, where appropriate);
- The moderator then opens for questions from the audience;
- The moderator then interrupts audience questions and answers, where appropriate, to follow up with questions that will develop better understanding of the subject.

A key to the success of the roundtable is the moderator. It's essential that this person be substantively grounded on the issues being discussed to ensure that major points are addressed. In a way, the moderator can be viewed as an investigative reporter whose job it is to get to the bottom of a problem by addressing more and more specific questions to the interviewees (panel members).

The moderator should have a clear understanding of what's to be accomplished by the roundtable and must walk a fine line between letting the audience take over the direction of discussion and being certain the session accomplishes its objectives. The moderator must not be afraid to:

- Take control of the session by cutting off lengthy discussions;
- Defer irrelevant issues;
- Request that members of the audience ask questions, not make speeches.

However, the moderator should also recognize that many of the more interesting issues are brought out during audience questions and answers, and that audience control of the program means audience involvement and learning.

We strongly advise that all participants in the roundtable discussions be briefed at least two weeks in advance on the purpose and format of the session. Before the Institute begins, the moderator should bring his/her group together to review his proposed strategy, to decide which questions to ask, who to call on first, etc. The combination of adequate advance preparation and a skilled moderator should be sufficient to ensure the success of the roundtable.

Reactor Panels: Looking over the program, you'll note we've scheduled a "reactor panel" for one session involving a film. Essentially a modified version of a roundtable, the purpose of this panel is to solicit reactions from a range of interest group representatives to the major points made in the film. Immediately following the film, the moderator will begin discussion by summarizing what he/she believes are the major issues raised in the film. Then he/she will pose key questions to members of the panel, soliciting their views. Questions from the audience will also be encouraged.

Again, the moderator should be someone with considerable substantive knowledge about flood hazard management and capable of asking appropriate probing questions. Prior to the session, the moderator and panel members should view the film. The moderator should then discuss with members of the panel the key issues raised in the film and how these should be addressed.

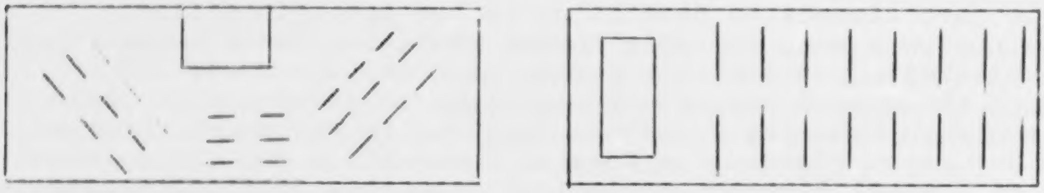
Room Arrangements

The set-up of the room in a plenary session is an important detail which you should not overlook. Factors such as how the chairs are arranged, where the speakers' podium and panel member chairs are located, and where the microphones are placed can all contribute to the success or failure of a plenary session.

- Your objective in arranging seating should be to bring the audience as close to the presenters as possible, enhancing their physical involvement in the discussions.

- If possible, chairs should be arranged in a wide semi-circle in front of the speakers platform allowing sufficient aisles for easy access (see diagram I).

Diagram I



Desirable Room Arrangement   Less Desirable Room Arrangement

- For any lengthy plenary sessions, you should consider seating participants at tables to provide them with a place to write and to rest their elbows. Most conference facilities should have narrow tables which serve this purpose well. However, if your only choice is wide tables which would require significant space and spread participants too far back in the room, you might decide not to use tables at all.

- We recommend that the chairs be unattached to the floor to allow greatest flexibility.

- The speakers' platform and panel members' chairs should be set on the same level as that of the audience. This arrangement creates a sense of intimacy and/or equality between the presenters and the audience rather than the sense of separation or superiority accomplished by an elevated speakers platform.

- If possible, chairs for members of panels and roundtables should be arranged so that the individuals can see each other, enhancing their communication.

- If the audience is large, microphones should be located at convenient locations in the room to enable participants to ask questions which everyone can hear.

  Note: You should advise all respondents to repeat the audience questions before answering them.

b. Small Group Discussions

A large portion of the training program is devoted to small group discussions which we feel are the most effective learning environments. The major purpose of all these discussion groups is the mastering of a particular subject. As we'll point out, however, the specific objectives of the various discussion groups differ significantly and it's important to understand these differences in order to brief resource people and discussion leaders.

Training Workshops: Training workshops are those designed to enable participants to develop or refine specific skills. They involve a very specific format (definite tasks to be accomplished), considerable period of time (2 hours), and require the use of specific tools prepared in advance. There are two such training workshops included in the model program: "The Nature of Flooding in Coastal Communities and the Special Role of Coastal/Riverine Ecological Resources in Flood Hazard Mitigation" (Lesson Plan No. 5), and "Designing a Flood Hazard Management Program in Coastal/Riverine Communities" (Lesson Plan No. 15).

A great deal of material needs to be covered in each of these workshops, so it's essential that the workshop leaders be well briefed on how to conduct their sessions. We suggest that workshop leaders and major resource people for these sessions be put through an actual training session using the workshop tools.

Detailed discussion of the format and procedures of these sessions can be found in the Lesson Plans section of this manual. General guidance for all small group discussion leaders is included later in this section.

Information Workshops: The purpose of these sessions is to provide participants with additional information on a particular subject. The format thus involves a brief presentation (15-20 minutes) by an expert on the topic followed by questions from the audience.

Workshops falling into this category include:

- Flood Hazard Management: Issues and Programs (Lesson Plan No. 10)
- Local Strategies for Flood Hazard Mitigation: Case Examples (Lesson Plan No. 11)
- Issues in Public Participation (Lesson Plan No. 14)

Although the general topic will be determined in advance, the specific direction of the discussion will depend on the interest and concerns of both the presenter and the participants. We suggest that the discussion leader (who may or may not be the resource person) go around the room asking participants to state their background on the issue and state what they'd like to cover in the workshop. Based on these comments, the presenter can then decide how to tailor his remarks to best suit the needs of the audience.

Working Groups: A third type of small group discussion involves participants from a common geographic area (state, watershed, community). These groups, which we refer to as "working groups", meet several times during the course of the Institute providing continuity and a clear focal point for the Institute. The purpose of these sessions is to enable participants sharing common geographic conditions to discuss issues of common concern and, more importantly, to develop specific follow-up activities to address these issues. These are action oriented sessions with a specific end-product expected.

The role of the facilitator in these small group discussions will be to review the objectives of the session and to involve all the group members in the subsequent discussion. The facilitator will not be expected to make any formal presentation although he/she may offer the group the benefits of his/her expertise or experience when appropriate.

The individual selected to head these small group discussions should be someone very familiar both with the geographic area and the substantive issues of concern. If these groups are organized according to state, you might consider appointing two co-leaders - the state Flood Insurance coordinator and a statewide citizen leader. For a smaller geographic region, you might consider appointing a staff member of the appropriate basin or watershed commission or an informed local official.

Again, it is important that these facilitators be briefed well in advance on their role and responsibilities as group discussion leader.

Basic Procedures for Discussion Groups.

Regardless of the specific objectives of a discussion session, there are a number of general procedural steps which all discussion groups must follow to ensure that the discussion moves smoothly. These include:

1. Define terms and concepts. Before beginning any discussion, it is essential to define new terms so that all participants understand their meaning. The discussion leader should keep a list of these terms on newsprint in the front of the room and add to it throughout the session as appropriate.

2. Establish discussion goals: Identify major themes. The purpose of this step is to give participants a sense of the overall discussion and the desired outcomes. The discussion leader should review the session goals, allow participants to modify these goals, and then get a general group consensus about the nature of the discussion to take place.

3. Allocate time. Within the time allotted as to the session, the group should assign priorities for how the time is allocated. If a speech is scheduled, how long should it be? If questions are to be considered, which ones are most important to discuss first? Too often a discussion group will spend so much time on minor topics that major topics are not adequately addressed. The discussion leader should adhere to this time allocation as closely as possible or he/she might choose to appoint an independent "time keeper" to keep the group on schedule.

4. Discuss major themes and subtopics. Within the time allocations agreed to by the group, members will participate in a discussion of key issues. Controversy should be encouraged to increase the involvement, excitement, and fun of group members.

5. Integrate materials. An important step in any discussion group is to provide a context for the material being discussed. For example, how does the material covered in one session relate to topics discussed earlier or to be discussed in subsequent sessions? The discussion leader has an important role here in summarizing major themes and pointing out how they substantiate, amplify, or possibly contradict previously made points.

6. Apply the materials. Group members should be clear on how the materials covered on the workshops relate to their own personal situation. The discussion leader should ask participants to discuss how they might apply the specific information presented to their own communities.

7. Evaluate the quality of discussion. This is a particularly appropriate step for the "working group" sessions which will meet several times throughout the institute. Participants should be asked whether or not they feel the group has achieved its primary goals and how subsequent discussions might be improved.

Guidelines for Small Group Discussion Leaders

The purpose of discussion groups is for people to learn from their discussion and interaction with one another. It's most important for discussion leaders to remember that their role is to promote discussion without controlling or dominating it.

Listed below are some additional responsibilities which discussion leaders must assume.

1. Introducing the discussion session. Explain to participants the purpose of the session, recording on newsprint the major goals to be accomplished. Go around the room asking each participant to identify themselves and their particular interest in the session. Try to remember names. Also explain what your function is as discussion leader and what process rules you'd like the group to observe throughout the discussion. Dispense with any unnecessary formalities.

2. Serve as a task-oriented time keeper. Keep the group moving so it doesn't get sidetracked or bogged down. Cut off any long winded or irrelevant comments. Try to be polite, but if you have a particularly obnoxious individual you may have to be firm--past politeness.

3. Ensure that learning is focused. Restate and call attention to major ideas of the discussion.

4. Create a warm supportive climate for open discussion. It's important that all group members feel secure about expressing their views without fear of being ignored, ridiculed, criticized, or otherwise embarrassed.

You can accomplish this by: 1) helping members to become better acquainted; 2) listening attentively to what each group member is saying without evaluating or judging their comments; 3) ruling out preaching or moralizing by you or group participants; 4) encouraging everyone to contribute but not forcing anyone to contribute until they are ready. Try not to call on the same people all the time; 5) being enthusiastic about the topic of discussion; 6) encouraging controversy within the group so long as it relates to issues and not personalities. Among other things, controversy offers a group the opportunity to make creative and high-quality decisions, to build the group's commitment to implement the decision, and to stimulate interest and curiosity.

5. Provide a sense of closure. A few minutes before the group's discussion is scheduled to close or when the topic has been exhausted, you should summarize the significant points made in the discussion. This summary should be brief but should not be a last minute statement made as people begin to leave the room. At this time, you should thank group members for their participation and let them know where and when they meet next.

Brainstorming

In certain of the small group discussion sessions included in this model program, we call for the use of a discussion technique know as brainstorming. Essentially, brainstorming is a method for generating many different ideas over a short period of time, getting full participation from all group members. It represents a period of time when all evaluation is suspended and ideas are allowed to develop freely on a particular issue.

The steps involved in conducting a brainstorming session are simple:

1. Provide all group members with a list of the rules. These include:

    - Ideas are suggested to the group without evaluation or critical analysis.
    - Any idea is acceptable - the crazier the better. Practical considerations are not the most important ones.

- Quantity of ideas counts - not quality. A great number of ideas increases the likelihood of discovering good ones.

- Build on ideas of other group members where possible.

- Focus on a single problem or issue.

- All group members must contribute ideas; everyone is an expert; all ideas are equally well received.

- State your idea quickly and concisely.

2. Get the group to agree on one specific question or problem as the brainstorming topic. Make sure all terms are clear.

3. Write the question or problem on the newsprint.

4. Go to it. The group leader should record every idea suggested. Writing as quickly as possible, the leader should keep track of who's participating and encourage silent ones to contribute their ideas. The time required for brainstorming a question will vary with the complexity of the topic. Simple questions will require no more than three to five minutes. More difficult ones could take more than 15 minutes.

Once all ideas have been recorded, then the group leader can begin a discussion of the ideas presented, asking participants to consider the entire range of possibilities in developing a viable solution.

LESSON PLANS

LESSON PLANS

A. COASTAL TRAINING INSTITUTE

LESSON PLAN NO. 1

COURSE TITLE: Flood Hazard Management and Natural Re
Protection: The Coastal Setting.

LESSON TITLE: Introduction TIME:

OBJECTIVES: 1. Welcome participants, officials and

2. Review goals of the Training Institu

SCOPE: Official opening of the workshop by welc
participants, officials and guests; a ge
description of the workshop purpose, obj
scope and subject areas; welcoming remar
dignataries; introduction of group coord
and/or staff instructors, assignment of
to groups; orientation to sequence of wo
sessions, time schedules, and facilities
of agenda changes, if necessary) adminis
announcements.

FORMAT: Plenary session. Speech by Institute Di

REFERENCES: 1. Instructor:
a. Trainers' Manual, Lesson Plan No
b. Coastal Student Manual

2. Participant
a. Coastal Student Manual

REQUIREMENTS: Large room set up for plenary session,
up front for speaker.

REMARKS: 1. This is intended as a brief session
the Director with an opportunity to
open the training institute, welcome
and introduce officials and invited

The Introduction is also the best time to cover any administrative details such as room assignments, reimbursement procedures, locations of various sessions, etc. Until questions regarding these issues are resolved, participants will not be prepared to concentrate on substantative matters.

2. By the close of the Institute, participants are expected to have developed plans for the specific activities they will undertake when they return home to begin a community dialogue on a flood hazard mitigation and natural resource protection program. During the last session of the program, the small groups will report on their planned follow-up activities. During the welcoming remarks it is extremely important that the Director of the Institute lay out for participants:

   -- the goals of the Institute;

   -- what they are expected to have accomplished before leaving the Institute;

   -- the nature of the small group reports to be presented on day three; and

   -- the manner in which the Institute has been constructed to help participants achieve the stated goals.

   The Institute Director will want to examine Lesson Plans 2, 13, and 17 to be certain that he/she can communicate to participants what's expected of them and how they will get there.

3. It may be very helpful to introduce the Steering Committee members during this introductory session. Invite participants to feed suggestions regarding improvements in the program to these individuals or directly to you, the Institute Director Be certain to note, while inviting such comment, that it may not be appropriate to accommodate all suggested changes at this late date, but that some adjustments and modifications are possible.

LESSON PLAN NO. 2

OURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting

ESSON TITLE: Introduction of Participants TIME: .75 Hour

BJECTIVES:

1. To introduce community participants and their communities to each other.
2. To establish the function of the "working group" at the conference.

COPE: Introduction of participants to others sharing similar geographical area (state, substate, watershed). Brief discussion of participant community flooding problems and review of purpose of small group discussions.

ORMAT:

1. Small group discussion within Plenary room. The director should divide participants into pre-designated small groups (groups will be divided according to some common denominator such as a state, substate or watershed area.)
2. Small group leaders selected by the director in advance will review for participants the purpose of the small group "working" session recording these objectives on the newsprint.
3. Next the group leaders will ask participants to introduce themselves highlighting their community flood hazard management concerns and what they hope to gain from the Training Institute. Group leader will record these concerns on newsprint for future reference.
4. This session is intended to be brief and informal. Participants should have a chance to get to know each other and to "tell their stories."

REFERENCES:

1. Instructors:
   a. Trainers' Manual, Lesson Plan No. 2
   b. Coastal Student Manual
2. Participants:
   a. Coastal Student Manual

REQUIREMENTS:

1. Sufficient space must be provided in plenary room so that participants can divide into small groups for discussion. Chairs should be unattached to the floor so that participants can simply pick them up and move them to the corner of the room where his/her particular group will be meeting.
2. Easels with newsprint and magic markers should be provided for each small discussion group.

REMARKS:

1. These small groups will be the working focus of the Institute. The group should be designed to have no more than 20 people.
2. The small group should be designed around a common geo-political area. If the conference is a multi-state regional conference, the working groups might be state oriented. In a state wide conference the working groups might be organized around watersheds.
3. The assignment of participants to smaller groups should be accomplished before the Institute. Participants will receive their group assignment at registration.
4. The leaders of these small groups will be selected from among participants before the conference. They will often be steering committee members, and will usually come from the non-governmental segment of the audience. The key criterion for selection of a working group leader is that the individual be a good discussion leader and facilitator.

PLAN NO. 3

COURSE TITLE: Flood Hazard Managment and Natural Resource Protection: The Coastal Setting.

LESSON TITLE: Flooding and Flood Hazard Management in Coastal Areas: An Overview. TIME: 1.5 Hours

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OBJECTIVES:

1. Develop participant understanding of inherent complexities of coastal flood hazard management.
2. Give an historical perspective to coastal flood hazard management.
3. Address changing directions in coastal flood hazard management in response to the perceived weaknesses of the traditional approach.

SCOPE: The nature of coastal flood hazards; the special economic social, and environmental problems of protecting coastal populations and properties from flood damage; the difficulties of timely and accurate hurricane prediction; ecologically sensitive areas in the coastal floodplain; an historical perspective on coastal flood hazard management, the traditional problem solving approach vs. new directions; why government policies are changing.

FORMAT:

1. Plenary session. Film, followed by roundtable discussion reacting to issues raised by film.
2. Resource people: Moderator, plus three discussants from different perspectives, e.g.,

   a) local government;

   b) environmentalist;

   c) disaster relief specialist;

   d) hurricane weather specialist.
3. Skilled moderator will lead the discussion by posing a series of questions to panel members.

REFERENCES: 1. Instructor:

a. Trainers' Manual, Lesson Plan No. 3
b. Coastal Student Manual.
c. Flood Hazard Management and Natural Resource Protection: Community Action Guide", FEMA, Chapter I.

2. Participant:

a. Coastal Institute Student Manual.
b. Flood Hazard Management and Natural Resource Protection: Community Action Guide", FEMA, Chapter I.

REQUIREMENTS:

1. Large room should be set up for plenary session.

2. The session will start with a dramatic film depicting coastal storms and the damage they can do. The film suggested in this model program is one on coastal hurricanes entitled "A Lady Called Camille". It was produced in the 1960's by the Army Corps of Engineers and is available from your Regional FEMA Office.

3. The film should be reserved well in advance of the Institute. The Institute Director should screen the selected film in advance to ensure its appropriateness.

4. Movie projector, screen (slide projector) should be reserved from conference center in advance.

5. Roundtable discussion will require that a table with a sufficient number of chairs and microphones be set up in front of the room. The table should allow discussants to look at each other.

REMARKS:

1. The session is designed to expose participants to the major problems and issues of coastal flood hazard management as they bear on state and local governments. It is intended as an overview and not a comprehensive treatment. Panel members should be informed that they will not be expected to deliver any formal remarks but rather to answer specific questions from their particular perspective. The questions should be sent to panel members at least two weeks prior to the Institute.

2. Prior to this session the director should bring panel members together to review once more the objectives of the session, to preview the film, and to develop a strategy for eliciting responses from panel members.

3. The director should provide panel members with a copy of the Resource Manual ahead of time and ask them to read Chapters I and II in preparation for their session.

4. The director should carefully brief the moderator on his/her role, stressing the importance of keeping responses brief and to the point, ensuring that all members of the panel have a fair opportunity to express their views, that the audience has ample opportunity to ask questions and that the session begins and ends on time.

5. The film selected for the model coastal program is most suitable for South, Mid-Atlantic, and Gulf Coast communities. Institutes involving Pacific Coast and North Atlantic communities may wish to search for another film that might be a more appropriate introduction to the coastal flooding problems facing your audience. If you feel that the hurricane film described above is not likely to be appropriate, you should begin analyzing alternatives early in the Institute planning process. Do not plan to use a film that you have not personally screened to make certain it meets the objectives of this section of the Institute.

QUESTIONS TO BE ADDRESSED BY PANEL:

1. What are the special problems of protecting the coastal floodplain? (Dynamic nature of coastal floodplain, fragility of coastal ecosystem.)

2. What is the relationship of watershed and drainage management to coastal flooding problems?

3. What kinds of difficulties are incurred in predicting the landfall and wind force of hurricanes?

4. In what manner do the special attractions of the beach contribute to social and economic difficulties in the management of coastal flood hazards?

5. What are the weaknesses of traditional approaches to coastal flood hazard management?

6. What are the changing directions in our current approach to coastal flood hazard management?

LESSON PLAN NO. 4

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting

LESSON TITLE: Establishing the Goals of Community Flood Hazard Management

TIME: .75 Hour

OBJECTIVES:

1. To identify various goals for community flood hazard management.
2. To explore how these goals differ according to various interest groups.

SCOPE: Identification and discussion of major goals for community flood hazard management. Categorization of goals according to interest group.

FORMAT:

1. Plenary lead by Institute Director.
2. At the start of the session the director should ask participants to take 5 minutes to select the 4 most important goals for community flood hazard management from a longer list of goals provided in Exercise A of their workbook. Then he/she should go around the room randomly calling upon participants to identify themselves, their interest group, and their four top goals. The director will record these goals on newsprint according to interest group.
3. Once the director feels he has a sufficient number of responses listed (10-15), he will then lead a discussion of these goals exploring the different perspectives identified by the various interest groups and how these might be reconciled in developing a comprehensive community strategy.
4. Following this discussion (approximately 10 minutes) the director will ask participants to once again rank the four major goals and then ask for a show of hands for each goal listed to establish the priority goals for the group as a whole.

5. The list of goals ranked by the group will be hung on the walls of the plenary session room and be referred to throughout the remainder of the Institute.

REFERENCES: 1. Instructor:
   a. Trainers' Manual, Lesson Plan No. 4
   b. Coastal Student Manual
   c. Flood Hazard Management and Natural Resource Protection: Community Action Guide" FEMA, Chapter III.

2. Participants:
   a. Coastal Student Manual
   b. Flood Hazard Management and Natural Resource Protection: Community Action Guide" FEMA, Chapter III.

REQUIREMENTS: 1. Large room set up for plenary session.

2. The director will need a large pad of newsprint on which to record participants list of goals. He will also need magic markers and masking tape.

REMARKS: 1. The major goals of community flood hazard management to be discussed.

   a. reduce property loss;

   b. protect safety of population;

   c. reduce flood damage to public property;

   d. reduce erosion and sedimentation;

   e. preserve natural areas;

   f. minimize fiscal impacts of floods;

   g. preserve open space and recreation areas;

   h. maintain good water quality;

   i. encourage economic development; and

   j. distribute management costs fairly.

Exercise A

Goals for Community Flood Hazard Management

Of the goals listed below, which do you feel are the four most important to accomplish in developing a community flood hazard management program?

Rank/Goals

____ 1 Minimize fiscal impact of floods.

____ 2 Reduce erosion and sedimentations.

____ 3 Reduce property loss.

____ 4 Preserve natural areas.

____ 5 Protect safety of population.

____ 6 Reduce flood damage to public property.

____ 7 Distribute management costs fairly.

____ 8 Preserve open space and recreation.

____ 9 Maintain good water quality.

____ 10 Encourage economic development.

Which of the following categories of interest groups do you most closely identify with?

____ 1 Local officials.

____ 2 State officials.

____ 3 Floodplain resident.

____ 4 Local businessman (economic interests).

____ 5 Environmentalists.

____ 6 Civic group member (Red Cross, church group).

LESSON PLAN NO. 5

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting

LESSON TITLE: The Nature of Flooding in Coastal Communities and the Special Role of Coastal Ecological Resources in Flood Hazard Mitigation

TIME: 2.0 Hours

OBJECTIVES:

1. To assist participants in identifying and understanding the causes of flooding and the nature of flood hazards in their community.
2. To help participants understand the functioning of important coastal ecosystems for hazard mitigation purposes.
3. To familiarize participants with various uses of natural resource data and maps as community planning and decision-making tools.

SCOPE: Description of special ecological characteristics and hazard mitigation functions of natural coastal systems: beaches, oceans, estuaries, bays, and tidal rivers. Presentation of land use suitability analysis concepts. Hands on experiences utilizing natural resource maps as decision-making tools.

FORMAT:

1. Small group discussion sessions of 15-20 people each.
2. The session, if possible, should be directed by a discussion leader who is someone other than the resource person presenting the information.
3. An appropriate resource person will give a 15-minute "mini lecture" using whatever audio-visuals they choose. Their presentation should address (a) the nature of flooding problems in communities located in one of these three areas, and (b) the role played by ecological resources of these communities in moderating the hazard.

4. Following the "mini lecture", the discussion leader will direct questions to the audience regarding their own community situations and explore with them special ecological resources they might consider protecting in their communities.

5. After approximately 50 minutes the workshop leader should call for a 10-minute break during which he/she will spread out the mapping materials on the tables. Participants should be encouraged to stay in the room so as not to lose any time.

6. Next, the resource person will give a brief presentation (5-10 minutes) highlighting the use of land suitability as a planning tool. In his/her presentation the speaker will briefly describe the land suitability analysis process involving (1) the identification of environmental considerations or elements, (2) interpretation of this data on a resource by resource basis through the application of management principals to determine resource limitations, (3) the mapping of each resource variable on a common scale, and (4) the overlaying of variables to form an environmental composite or suitability map.

7. Finally, participants will have the opportunity for some "hands on" experience working with mapping materials especially prepared for this session. Materials will include (a) a U.S.G.S. quad sheet for a typical community type in that region (b) several mylar overlays depicting flood hazards, soils, wetlands, zoning and current land use, (c) a clear acetate sheet which participants can mark on with grease pencils, (d) handout describing materials and symbols displayed on maps.

8. The manner in which these materials are used in the exercise will depend on the sophistication of the group members. Therefore, at the beginning of this session the speaker should find out from workshop participants what experience they've had with maps.

   If the group is relatively unfamiliar with land use suitability analysis, the resource person should start off by directing participants to take the U.S.G.S. quad sheet

and then overlay the flood hazar
identify the 100 year flood boun
Next they might overlay the soil
identify those areas suitable fo
with and without septic tanks an
this information to the current
noting any inconsistencies. Fin
could repeat this process with t
mylar overlays, again noting inc
with current land use and/or zon

If the group is more sophisticat
discussion might focus on manage
which the community might adopt
existing data) to correct percei
or what additional data needs ex
they might be resolved.

REFERENCES: 1. Instructor:
- a. Flood Hazard Management and
  Resource Protection: Commun
  Guide, FEMA, Chapter II
- b. Coastal Student Manual
- c. Trainers' Manual, Appendix B

2. Participant:
- a. Coastal Student Manual
- b. Flood Hazard Management and
  Resource Protection: Commun
  Guide, FEMA, Chapter II

REQUIREMENTS: 1. Workshops will be offered on
of coastal ecosystems includ
ocean, estuary and bay and t
exact categories of workshop
depend on the geographic cha
the communities involved in
For example, if none of the
involved has an estuary or b
category of workshop will no
for the Institute. Prior to
participants will sign up fo
workshop topics which most c
their community's geographic
conditions. The optimal siz
workshops is 15-20 participa
on the size of the audience
of participants signing up f
topic, there might be anywhe
concurrent workshops address
topics.

2. The Institute director should identify as many qualified resource people as necessary (3-8) to present during these sessions. These individuals should be scientists, natural resource planners or other individuals with a good understanding of these types of ecological systems. The resource people might also serve as discussion leader for these groups or the Institute Director may want to appoint someone else as official discussion leader.

3. The Institute Director should, at registration, assign individuals to workshops according to their stated preference.

4. There should be sufficient breakout rooms to accommodate the number of workshops planned. Each breakout room should contain 2 tables and sufficient chairs to accommodate 15-20 people. Each should be equipped with an easel, newsprint and magic markers and 2-3 copies of the mapping materials (U.S.G.S. base maps, natural resource overlays, clear acetate, and grease pencils) to be used in this session. Workshop rooms should also contain any audio visual equipment (slide projectors, overhead projectors, screens, etc.) requested by the workshop leaders.

REMARKS:

1. Once again the Institute director will need to evaluate the mapping tools provided with his trainer's manual to determine whether or not the maps are appropriate teaching tools for this audience. Keep in mind that the purpose of the mapping exercise is to familiarize the participants with the type and use of maps. The maps used for the exercise need not match exactly with the type of flood hazard problems reflected by communities participating in the Institute. On the other hand, if the types of natural resources are dramatically different than those reflected in the maps provided, the exercise map be more useful if revised.

2. The experience of participants in using maps to discover the manner in which community development patterns and flood hazard mitigation strategies fit together is an important part of this exercise. When the mapping exercise is utilized the group should organize into two smaller groups, each standing around a table with the mapping materials on it (see blue lines of mapping materials, appendix B). The interaction of the participants as they work together to answer questions for the mapping exercise (see briefing memorandum, Lesson Plan No. 5, Appendix B,) is an important part of the learning experience.

3. If the Institute Director decides that he needs to develop a new set of mapping materials around a geographic area with resources, opportunities, and flood problems more common to participating communities, he will wish to:

   o Select an area which has had a variety of natural resource maps completed and for which a Flood Insurance Rate Map has been completed. The area should be partly, but not fully, developed so that the exercise can be used to discuss future opportunities as well as current problems.

   o Select and obtain a base map (usually a U.S. Geological Survey quad sheet) of an appropriately large scale -- not less than 1:24,000 -- containing both natural features and development.

   o Select natural resource maps and land use maps useful for analysis of the interactions between development flood hazards and natural resources. The maps used in the exercise described in this manual include:

     -- Soils map;

     -- Wetlands map;

    - -- Zoning map;
    - -- Development map; and
    - -- Floodway/flood boundary map developed from a Flood Insurance Rate Map.
  - o The natural resource and land use maps selected to overlay the base map should be redrawn onto mylar overlays and, of course, put on the same scale as the base map.
  - o University geography or environmental studies departments may be the best source of assistance in identifying possible communities to serve as the model for this exercise. They may also be able to supply a graduate student who can inexpensively redraw and rescale the map overlays.

4. Blue line copies of the natural resource overlays prepared for this coastal institute are included in Appendix B. Reproduction copies of these materials can be obtained from the FEMA Washington Office, Division of Training and Education.

5. The workshop handout materials included in Appendix B are designed to be part of the Student Manual.

QUESTIONS TO BE CONSIDERED:

1. What are the key coastal ecological resource types?
2. Where do they commonly occur? (In what associations?)
3. How sensitive are these resources to the activities of man?
4. What role do each of these resources play in flood hazard mitigation?
5. How can these resources be protected? What management policies should be applied?
6. What is a suitable community base map? (scale and availability)

7. What environmental factors or values are of particular importance to the community? (i.e., septic tank siting, hazard mitigation, etc.) What is the purpose or goal for the mapping project?

8. What technique, medium or materials are most appropriate to use in representing this information? How much will it cost?

LESSON PLAN NO. 6

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting

LESSON TITLE: Flood Hazard Management: Three Stories

TIME: .25 Hour

OBJECTIVES:

1. To create a mood of excitement regarding the opportunities to develop flood hazard management strategies to meet a variety of goals.
2. To introduce some of the ways in which the National Flood Insurance Program provides assistance to local communities.

SCOPE: Brief review of rationale for community flood hazard management. Presentation of three community approaches to particular flooding problems.

FORMAT: Plenary session. Slide show presentation.

REFERENCES:

1. Instructor:
   - a. Slide Presentation, "Community Flood Hazard Management: Three Stories." FEMA
   - b. Trainers' Manual, Lesson Plan No. 6, Appendix C.
   - c. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapter III.
2. Participant:
   - a. Slide Presentation "Community Flood Hazard Management: Three Stories." FEMA
   - b. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapter III.
   - c. Coastal Student Manual

REQUIREMENTS:

1. Large room should be set up for plenary sessions.

2. The slide show must be ordered from the FEMA Regional Office. It is available in two versions--a two-tray dissolve show with audio cassette and a single-tray version also with an audio cassette. The two tray dissolve show is more sophisticated and polished than the single tray version, but is also more complicated to operate. It requires the use of two automatic focus slide projectors (Kodak AF-1 or AF-2), a dissolve unit (Clearlite diamond or micro diamond) and an industrial slide tape player (Wollensak). It's essential to have the proper equipment. The dissolve unit and tape player may have to be rented from an audio-visual equipment dealer and not all dealers carry the necessary equipment. Be sure the assemble the necessary equipment well in advance of the Institute and run through the slide show to ensure that all is in working order. The equipment dealer should be able to give instructions on how to set up the equipment.

   The single tray version, while less sophisticated than the dissolve version, is also simpler to present. It requires only a standard slide projector and industrial slide tape player (Wollensak or others designed to handle 1000hz inaudible pulse signals). Again, be sure to test the equipment prior to the Institute to be sure it's working properly.

REMARKS: 1. The presentation is an inspirational piece designed to explore creative approaches to local flood hazard management. It will be followed immediately by small discussion sessions in which participants will focus on some of the major points made in the slide presentation.

LESSON PLAN NO. 7

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting.

LESSON TITLE: Designing a Flood Hazard Management Program: Identifying Goals, Opportunities and Strategies **TIME:** 1 Hour

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OBJECTIVES:

1. To reinforce the varying opportunities for flood hazard management presented by the slideshow.
2. To relate these opportunities to the pre- and post-flood stages of flood hazard management.
3. To highlight the importance of local initiative in taking advantage of various state and federal assistance.
4. To relate various opportunities and strategies described in slide show to goals described in preceding days session and still taped to wall of plenary session room.

SCOPE: Review of flood hazard management goals used by communities depicted in the slide show. Discussion of various opportunities and strategies available to the communities in the slide show during both the pre- and post-stages of flood hazard management. Emphasis on importance of local initiative. Relating goals and actions of communities in the slide show to goals listed by participants early in the Institute.

FORMAT:

1. Concurrent small group discussions within plenary session. The Institute Director should ask participants to break down into small discussion groups of 10-20 individuals. The easiest way to do this is simply to divide the large room into sections and ask individuals in each section to take their chairs to a particular spot in the large room. Each group will be assigned a discussion leader. Allow 5-10 minutes for the small groups to establish themselves.
2. Discussion leader should begin the session by asking participants to introduce themselves.

3. Next, the discussion leader will ask participants to discuss a series of questions using prepared work sheets to record their responses. The questions include: (see Exercise B)

   a) What were the goals of the flood hazard management programs adopted by the three communities in the slide presentation? How do these goals relate to those identified in the earlier session?

   b) What opportunities did each of the communities explore in developing their flood hazard management programs and to what stage (pre-flood or post-flood) of flood hazard management were the programs directed?

   c) What specific strategies did the three communities adopt to implement their flood hazard management plan? To what extent were federal and state agencies involved? What additional assistance might have been employed in each situation?

REFERENCES: 1. Instructor:

a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapter III

b. Trainers' Manual, Lesson Plan No. 6 and 7.

2. Participant:

a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapter III.

b. Coastal Student Manual

REQUIREMENTS: Large room should be set up for plenary session. Chairs should be capable of being easily rearranged into smaller discussion groups.

REMARKS: 1. Discussion leaders should be individuals familiar with the subject of community flood hazard management. They might be planners, professors, or local officials with experience in developing a community plan, etc.

2. Discussion leaders should view the slide show in advance of this session and should also be provided with a copy of the script and worksheets (with answers).

QUESTIONS TO BE CONSIDERED:

1. What are the variety of goals that the communities in the slide show tried to achieve?
2. What were the obstacles that those communities had to overcome? How did they overcome these obstacles?
3. What factors should be considered in developing a community flood hazard management program?
4. What approaches best address problems of existing development within the flood hazard area?
5. What approaches are best to control new development?
6. What kinds of federal/state/local assistance are available to assist communities?
7. What are the differing opportunities available to communities regarding their developed land versus their undeveloped land? What are the differing opportunities available before or between floods, or after a major flood?

EXERCISE B

1. What were the goals of the flood hazard management programs adopted by the three communities in the slide show?

	Montgomery County	Baltimore County	Sanibel Island
Goals	Reduce property loss; Minimize fiscal impacts; Protect safety of population.	Reduce property loss; Minimize fiscal impacts; Protect safety of population; Preserve open space and recreation.	Protect lives by preserving conservation capability; Reduce property loss; Preserve natural areas; Reduce erosion sedimentation.

How do these goals relate to the general list of goals developed in the previous session?

2. What opportunities did each of the communities explore in developing their flood hazard management programs and to what stage (pre-flood or post-flood) of flood hazard Management. Were the programs directed?

	Montgomery County	Baltimore County	Sanibel Island
Opportunities	Flood damaged homes; Owners willing to relocate; Federal agency assistance made available to relocate residents.	Flood damaged homes; Owners willing to relocate; County in need of recreation open space; County committed to solving its own problems in a comprehensive way; Active citizen involvement in planning process.	Valuable natural resources; Active citizens' groups committed to protecting qualities of the Island; Significant land still undeveloped.
Flood Hazard Management stage addressed	Post-disaster	Pre- and Post-disaster (comprehensive plan)	Pre-disaster (comprehensive plan)

DIRECTIONS: The boxed in areas contain answers to the questions to be posed to the group. This exercise is reproduced in the student manuals with the answers omitted. It should be presented to the group in that format to guide their brainstorming effort.

EXERCISE B (continued)

3. What specific strategies did each community adopt to implement their flood hazard management plan?

   To what extent were federal and state agencies involved?

   What additional assistance might have been employed in each of the community situations?

	Montgomery County	Baltimore County	Sanibel Island
Strategies	Enforcement of existing ordinances by denying building permits for flood damage properties located in floodway.	Development of comprehensive plan including cost/benefit analysis of alternative strategies for flood hazard management; Strict regulation over new development in floodplain; Relocation of damaged properties using county funds.	Comprehensive plan; Strict regulations to control development and protect natural resources; Warning and evacuation plans.
Federal and State Involvement	NFIP Constructive Total Loss declaration relocation assistance.	Little or no federal involvement in relocation efforts.	Primarily local effort; FIA assistance in providing basic flooding information.
Additional Assistance			

LESSON PLAN NO. 8

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting.

LESSON TITLE: The Federal and State Framework for Community Flood Hazard Decision Making

TIME: 1.25 Hour

OBJECTIVES:

1. To outline the structure and functions of various Federal and State programs that affect community flood hazard management:
2. To relate these various activities to the goals of community flood hazard management previously identified by participants.

SCOPE: Various federal and state programs that affect coastal flood hazard management including: NFIP, Floodplains and Wetlands Executive Orders, Coastal Zone Management and State Natural Resource Management Programs.

FORMAT:

1. Speech followed by roundtable discussion of key questions posed by moderator.
2. Audience questions and answers.
3. Roundtable participants should be selected from among the following interests:
    - FEMA regional office;
    - State coastal zone management program;
    - State FIA coordinator;
    - Local government; and
    - Citizen activist.

REFERENCES:

1. Instructor:
    a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters IV, V, and VII
    b. Trainers' Manual, Lesson Pl

2. Participant:
    a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters IV, V, and VIII.
    b. Coastal Student Manual

REQUIREMENTS:

1. Large room should be set up for plenary session.

2. Speaker will require podium and possibly audio visual equipment if requested.

3. Panel discussion following speech will require table with sufficient chairs for panel members speaker and moderator.

REMARKS:

1. Speaker gives 1/2 hour presentation (using audio visuals if possible) outlining the various federal and state programs likely to impact coastal flood hazard management. Speaker will begin by highlighting major objectives and requirements of the Executive Order(s) identifying how these can impact local governments. Speaker will then briefly review function of the National Flood Insurance Program in relationship to other federal programs and the role of FEMA and the state FIA coordinator. Finally, the speaker will discuss the Coastal Zone Management Program as a coordinating mechanism for the range of federal coastal programs, how it's being implemented at the state level and how other state natural resource management programs might be utilized to enhance community flood hazard management.

2. Following the speech, the speaker will participate as a panel member in a roundtable discussion of key questions posed by the moderator and members of the audience. Panel members will represent the range of federal and state interests involved in Coastal Flood Hazard Management. The moderator will pose a series of questions to various panel members designed to elaborate or reemphasize points made in the speech. Panel members will be given these questions in advance and should be prepared to give direct, concise answers.

The moderator's job will be to ensure that responses are brief, and to the point, that all panel members participate and that members of the audience have time to ask their own questions.

QUESTIONS TO BE ADDRESSED:

1. What are the respective responsibilities of the Federal and State governments in flood hazard management.

2. How well are various programs coordinated at the Federal level? How might coordination be improved?

3. What new initiatives are being implemented to improve federal coordination?

4. What are some of the approaches that creative state governments have used to meet their challenge in mitigating flood hazards and protecting natural resources.

5. How do most state governments relate their role in flood hazard management to that of the local community.

6. How is the role of the State likely to be affected as the result of new federal initiatives?

LESSON PLAN NO. 9

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting.

LESSON TITLE: The National Flood Insurance Program: What it Does and Doesn't Do

TIME: 1 Hour

OBJECTIVES:

1. To bring participants to a common level of understanding concerning the specific minimum requirements of the NFIP.
2. To familiarize participants with the tools of the NFIP.
3. To examine the extent to which the NFIP will help to meet the range of community flood hazard management goals.

SCOPE: Minimum requirements of the NFIP, basic tools (maps, FIS study, flood profiles) provided by NFIP, issues which NFIP addresses, issues not addressed by NFIP.

FORMAT:

1. Plenary session. Speech followed by roundtable discussion of key questions posed by moderator.
2. Questions and answers.
3. Roundtable participants should be selected from the following interests:
    - FEMA Regional Office
    - State FIA Coordinator
    - Local Official
    - Civil Defense Agent
    - Environmentalists

REFERENCES:

1. Instructor:
    a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapter IV.
    b. Trainers' Manual, Lesson Plan No. 9
    c. NFIP Slide Presentation, FEMA. (optional)

2. Participant:
   a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapter IV.
   b. Coastal Student Manual.

REQUIREMENTS:

1. Large room set up for plenary session.

2. Visual displays of Flood Hazard Boundary Maps, Floodway, Flood Boundary Maps, FIRM Maps, Flood Profiles. The speaker should provide his/her own visual aides but may require slide projector and/or overhead projector.

3. Podium for speaker. Table and chairs set up front for Panel Members.

REMARKS:

1. Speaker gives 15 minute presentation illustrated with slides, outlining the two phase process of the NFIP, the major requirements of the NFIP and the major tools (Flood Hazard Boundary Map, Floodway/Flood Boundary Map, FIRM map, Flood Profiles and FIS).

2. Following this presentation, a panel consisting of representatives of other federal, state and local interests will react to the presentation based on questions posed by a moderator. The purpose of these questions (which panel members will have in advance) will be to highlight both the strengths and shortcomings of the NFIP, identifying areas where communities might want to improve upon the minimum requirements of the NFIP.

3. Once the panel has reacted to the short list of prepared questions, the moderator will open up discussion to questions from the audience.

QUESTIONS TO BE CONSIDERED:

1. What are the two phases of the NFIP? How does a community enter the NFIP?

2. What are the basic regulatory concepts and tools of community participation in the NFIP?

3. What are the minimum requirements of participation in the Regular program of the NIFP? What function do they serve?

   (a) What is meant by the Base Flood? 100-Year Flood?

   (b) What is a Flood Hazard Boundary Map, Flood Insurance Study, FIRM Map, Floodway/Flood Boundary Map?

   (c) How are Flood Profiles interpreted?

4. What new initiatives are being considered for the NFIP Program (1362, constructive total loss, Flood Plains Executive Order)? How will these initiatives likely affect development of community flood hazard management programs?

5. What provisions does the NFIP Program incorporate to protect certain coastal ecological resources (sand dunes, mangrove swamps, barrier islands)?

LESSON PLAN NO. 10

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting.

LESSON TITLE: Flood Hazard Management: Issues and Programs TIME: 1 Hour

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OBJECTIVE: To allow participants to explore in more detail the various issues and programs described in the earlier sessions.

SCOPE: Detailed look at various issues and programs relating to the NFIP including: building standards, NFIP regulations, Section 1362 of National Flood Insurance Act of 1968, flood hazard mapping, Coastal Zone Management.

FORMAT:

1. Concurrent workshops (4-5) focusing on a variety of flood hazard management issues. Participants select workshop topic of most relevance to them.
2. Resource people who are experts on the particular topic will give a 10-20 minute presentation using audio-visuals of their own selection where appropriate. Workshop leaders (who may or may not be the same as the resource person) will begin the session by going around the room asking participants to identify themselves and why they selected this workshop. Then the resource person will give his presentation tailoring his remarks to meet the needs of the audience.
3. During the remaining portion of these workshops the group leader will conduct a discussion of key issues or questions relating to the workshop topic.

REFERENCES:

1. Instructor:
   a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters IV, V, and VII.
   b. Trainers' Manual, Lesson Plan No. 10.

2. Participant:
   a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters IV, V, and VII.
   b. Coastal Student Manual

REQUIREMENTS: 1. Separate break out rooms will be required for each of the workshops offered during this session. Rooms should be equipped with audio visual equipment and easels as requested by workshop leaders.

REMARKS:

1. Participants elect to attend one of several workshops offered concurrently.

2. The workshop topics suggested here are offered as examples of the kinds of issues best addressed during this session. The Institute director with assistance from the Steering Committee should determine which of these topics (as well as possible others) are most appropriate for the particular geographic region and audience involved.

QUESTIONS TO BE ADDRESSED DURING WORKSHOPS:

A. Building Standards

1. What requirements of the NFIP relate to buildings? Do these requirements only deal with the impact of floods or do they also address other special needs of building in hurricane prone areas.

2. What specific provisions should be included in a local building codes to insure that elevated new structures are built to withstand hurricane force winds? storm driven waves?

3. What lessons can be learned from experiences in communities recently hit by hurricanes (Gulf Shores, and Dauphin Island, Alabama)?

4. What problems might building inspectors anticipate in enforcing standards?

5. How do building requirements of the NFIP relate to the actuarially based insurance rates used by FEMA in coastal high hazard areas?

B. NFIP Regulations

1. What are the minimum requirements of the NFIP (Regular Phase) in terms of elevations, construction, and land use?

2. What specific requirements does the NFIP pose for new construction in the high velocity zone?

3. On what basis have elevation requirements been established in the past? How will wave heights be factored into the formula for establishing actuarial rates for new construction?

4. To what extent are barrier islands, dunes, and other fragile coastal ecosystems protected under the NFIP regulations?

C. Section 1362 (Post Disaster Acquisition/Relocation under NFIP)

1. What is Section 1362? What are its major provisions?

2. How is Section 1362 being implemented currently? How much money has been appropriated?

3. How is eligibility for 1362 funds determined? What procedures must communities follow to acquire 1362 funds?

4. What restrictions are placed on the use of 1362 funds?

D. Flood Hazard Mapping

1. What role do maps play in the NFIP?

2. What is the status of FIA's community mapping process?

3. What is the data base of the community map? What are the sources of possible error in flood hazard boundary mapping? What kinds of changing conditions might affect the communities of flood hazard boundary?

4. What is the process of amending maps to reflect changing conditions?

5. How are existing maps going to be amended to reflect wave height data? How long will the process take? What should communities do in the interim before their maps are amended to regulate new development in high velocity zones?

6. What is the status of the new FIA map locator service?

E. Coastal Zone Management

1. What's being done at the Federal level to coordinate coastal zone management and flood hazard mitigation?
2. How might an approved state coastal zone management plan be useful to a community in achieving flood hazard mitigation goals?
3. What types of assistance are available to communities from the state CZM office?

LESSON PLAN NO. 11

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting

LESSON TITLE: Local Strategies for Flood Hazard Mitigation: Case Examples TIME: 1 Hour

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OBJECTIVES:

1. To allow participants to examine in detail the way a particular community utilizes a strategy (or set of strategies) to accomplish flood hazard mitigation goals.
2. To focus attention on the stages of flood hazard management (pre and post) to which the strategy was applied.
3. To highlight the role of various federal, and state programs (NFIP, CZM, WQM) in accomplishing the strategy.
4. To relate the strategies to the goals of flood hazard mitigation identified previously.

SCOPE: Review of specific strategies that different communities have employed to manage coastal flood hazards, highlighting community goals, the design and implementation of the strategy, and the role of federal, state, local and public actors. The focus will be on key factors in making the strategy work. Specific strategies addressed might include: relocation, recreation/acquisition, storm water management, zoning, critical areas protection, development standards.

FORMAT:

1. Concurrent Workshops (3-4) focusing on specific community case example.
2. Participants select case example which best reflects their community situation.
3. Workshop leader who is a resident of the case community gives brief presentation then leads group discussion.

REFERENCES: 1. Instructor:

- a. Flood Hazard Management and Natural Resource Protection: Community Action Guide; FEMA, Chapters II, III and VI.
- b. Trainers' Manual, Lesson Plan No. 11, FEMA.
- c. Trainers' Manual, Small Group Discussions

2. Participant:

- a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters II, III and VI.
- b. Coastal Student Manual

REQUIREMENTS:

1. Break out rooms will be required for the 3-4 separate workshops, each equipped with any audio-visual equipment requested by the workshop leader.

2. Workshop leaders should be asked to submit, at least 2 weeks in advance of the Institute, a one page description of the community situation they will be describing in their presentation. This summary should include a description of the size and geographic conditions of the community, major flooding problems, strategies proposed and/or implemented to resolve the flooding problems.

3. If possible the summary should be printed in the workbook but otherwise should be handed out at registration to allow participants time to read them and select the one they're most interested in hearing more about.

REMARKS:

1. Participants elect to attend one of 3-4 concurrent workshops focusing on specific communities' approaches to flood hazard management. Workshops will be led by community leaders with experience in implementing a particular strategy or set of strategies at the community level.

2. Workshop leader will begin the session with a 15-20 minute presentation accompanied by slides and other appropriate visuals.

The presentation will first d community's flooding problems social, and economic situatio natural resources and any exi hazard management program. T sentation will describe the m efforts to adopt or strengthe flood hazard management progr actors involved and the strat

3. Following the presentation, t leader will answer questions

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QUESTIONS TO BE CONSIDERED:

1. What are the major flooding problems

2. What are the estimated costs to the c recurrent floods?

3. What opportunities did the community begin to address their flooding probl pre flood situation? In the post flo

4. What specific flood hazard management were proposed? Which ones were rejected a ones were adopted?

5. Who were the actors involved in the d process? How were they involved?

6. What community, state and federal res required to implement the particular How were these resources obtained?

7. What lessons have been learned by com in the process? What things might th differently if they were to start ove

LESSON PLAN NO. 12

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting

LESSON TITLE: The Role of Public Participation in Community Flood Hazard Decision Making

TIME: 1.5 Hours

OBJECTIVES

1. To establish the importance of involving various publics in developing a community flood hazard management program.

   -- Building a constituency for a comprehensive program.

   -- Ensuring equity.

   -- Building a constituency for implementation.

2. To establish some performance standards for effective public participation.

3. To expose participants to the range of techniques that are available for public involvement.

SCOPE: Importance of public involvement, various publics affected by flood hazard management programs, performance standards for effective public involvement, tools and techniques for public involvement.

FORMAT:

1. Plenary Session. Speech followed by roundtable discussion with key questions posed by moderator. Audience Questions and Answers.

2. Speaker familiar with public involvement issues gives presentation addressing the importance of public involvement, who should be involved and why and how to achieve effective involvement.

3. Following the speech, the workshop director (or moderator) will ask participants to complete Exercise C found in their workbooks and then, for each question in the exercise, randomly select several participants from the audience to state their names, interest

group and their particular response. The workshop director will record these responses on newsprint. This process should require no more than 10 minutes.

4. Next the workshop director will introduce several panel members, all of whom have particular experience with public participation, and ask each one to elaborate on the points made in the speech as well as comment on the results of the exercise, drawing upon their own experience whenever posible.

5. Following these brief (5 minute) responses from panel members, the workshop director (or moderator) will open discussion to questions from the audience.

REFERENCES:

1. Instructor:
   a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapter VI.
   b. Trainers' Manual, Lesson Plan No. 13, FEMA.
   c. Flood Hazard Management and Natural Resource Protection: Community Action Guide Summary. FEMA.

2. Participant:
   a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapter VI.
   b. Coastal Student Manual
   c. Flood Hazard Management and Natural Resource Protection: Community Action Guide Summary. FEMA.

REQUIREMENTS:

1. Large room should be set up for plenary session.

2. Easel with newsprint should be provided for speaker to record participant responses.

3. Table and chairs should be provided for Panel Members.

REMARKS:

1. It's important that the initial responses of panel members be kept brief to allow time for questions from the audience. Therefore, panel members should be well briefed on their role prior to their session and the moderator should use an iron hand to keep responses brief.

2. It would be extremely useful if the speaker could provide copies of his speech to panel members in advance of the Institute. If not, the speaker should at least meet with panel members and the moderator prior to the session to discuss what points the speaker will cover and what follow-up points each panel member would like to make.

QUESTIONS TO BE ADDRESSED DURING SESSIONS:

1. Who are the key actors both within and outside of the community who should be involved in the development of a community flood hazard management program? What range of perspectives are they likely to represent and why is it important to include them?

2. What are some of the key decision points in the development of a flood hazard management program where the public should be involved. What specific kinds of information/input can the various publics provide at each of these decision points?

3. What role can or should the public play during implementation of the flood hazard management program?

4. To what extent in the past has the public been involved in developing a community flood hazard management program? What methods were used? What has been the result of this level of involvement?

5. Does the NFIP have any specific requirements or guidance for public involvement?

6. What are some of the essential elements of an effective community public involvement effort? What are some of the techniques which may be most useful in achieving quality public participation?

7. What are some potential sources of assistance to communities in developing a meaningful public participation effort?

EXERCISE C

INTRODUCTION OF PARTICIPANTS

Participants for the Flood Hazard Institute were chosen to represent a diversity of opinions and backgrounds. The purpose of this segment of the program is to give everyone a better understanding of the attitudes and perspectives shared by fellow attendees, resource people, and Institute staff.

DIRECTIONS FOR EXERCISE: Indicate your opinion on each question by marking the horizontal line with an "x" above the appropriate number. Then indicate how strongly you care about this issue by circling a letter from A (very important issue) to E (unimportant issue) on the vertical line. You will have ten minutes to mark your responses, and then we will sample opinion in the group.

1) How much weight should be given to public opinion in the development of a community flood hazard management program?

------1---------2-----------3----------4---------5-----

The decisions involve complex technical issues and should be made by experts	Equal weight should be given to public opinion and expert conclusions.	The important decisions in developing a flood hazard management program are not that technical, and the public, who has to live with the results, should have the primary say.

A (very important issue)

B

C (moderately important)

D (unimportant issue)

EXERCISE C (continued)

2) Granted that most people would like to see both environmental improvement and low taxes and economic development, how would you vote in a clear-cut choice between the economy and the environment in your town?

----------1------------2--------3-------4---------5-------

The economic stability of a community is the most important consideration. After all if people don't have jobs and money to spend they won't care about their environment.	Equal weight given to both	Maintaining the community's environmental quality is most important. Poor environmental quality produces all sorts of hidden community costs which too often aren't considered.

A (very important issue)

B

C (moderately important)

D

E (unimportant issue)

3) Should residents who knowingly choose to live in flood hazard areas be assessed some sort of tax to cover the community costs (emergency police, fire, rescue services, public utility repairs, warning and evacuation procedures) incurred as the result of a flood disaster?

------1--------2-------------3-------------4------------5---------

No, these are costs rightly borne by the community as a whole. Besides, it would be impossible to establish an equitable tax.	Possibly in situations where the flood hazard is well defined and the resident who has a choice between a non-hazard location chooses the hazardous location because of the personal benefits (aesthetics, convenience) derived from the hazardous location.	Yes, these residents reap the benefits of such a location, so they should also bear the costs.

LESSON PLAN NO. 13

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting

LESSON TITLE: Recommendations for Group Action

TIME: 1 Hour

OBJECTIVE: To continue discussion of the issues the working group identified the first evening and give that group opportunities to develop ideas for follow-up activities after the conference.

SCOPE: Continuation of earlier group discussion of community problems, state problems, action required to resolve problems (i.e., better data and data analysis, public education and involvement, intergovernmental cooperation, social and economic considerations).

FORMAT:

(1) Small group discussions

(2) Continuation of previous discussion described in Lesson Plan No. 2 with groups divided according to pre-determined geographic area.

(3) The group leader or facilitator of this session should be the same leader used during Lesson Plan No. 2.

(4) Using brainstorming/discussion techniques (page 56) leader then asks each member of group to address the following questions:

- What is the nature of the flooding problem in my community?
- What kinds of strategies might be employed to address these problems?
- How will the requirements of the NFIP and the state affect the manner in which flooding problems are address?
- Who are the community interests likely to be affected by flooding problems and their solutions?

- What kind of public involvement mechanisms have traditionally been successful in my community in involving these interests?

(5) Responses to each set of questions will be recorded in newsprint.

REFERENCES:

1. Instructor:
   a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters III and VI.
   b. Trainers' Manual, Lesson Plan No. 2 & 12, FEMA.
2. Participant:
   a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters III and VI.
   b. Coastal Student Manual

REQUIREMENTS:

1. Break out rooms will be required for each of the small group sessions. Rooms should be equipped with easels, newsprint and magic markers.

REMARKS:

1. The ultimate purpose of these small group sessions is not to develop a flood hazard management program for the community, but rather to develop a plan for involving a variety of community actors in the development of a flood hazard program. The plan for public involvement must be keyed to an understanding of the following factors:

   - What has already been accomplished in management of flood hazards in the community?
   - What opportunities for flood hazard management remain to be addressed?
   - How are the variety of publics in the community likely to respond to various flood hazard management strategies.

On the other hand, if the Institute involves a multi-state region and the small groups are organized by state, the working group facilitator will initially face certain problems in getting the group as a whole to develop action plans. For example, each state group will be composed of community leaders from a number of potentially very different communities. These individuals initially may find it difficult or distracting to attempt to discuss a wide range of community problems and issues.

2. One important benefit of these sessions, particularly in a multi-state region, is the opportunity provided for "cross-fertilization." Participants may gain new insights from hearing each other's analysis of the problems and opportunities they face. Participants from outside a particular community may be able to ask creative questions that will allow others to develop new ideas.

   As a means to deal with the diversity within the group, the group leader or facilitator may wish to address each of the questions listed under format to the entire group, then ask that the group subdivide itself into community or watershed groupings, and develop answers to the various questions allowing about 10 minutes for discussion. The subgroup answers would then be reported to the whole group, recorded on separate sheets of newsprint, compared and discussed.

3. It is unlikely that these small groups will fully accomplish all they have set out to accomplish during this session. If they manage to get through a discussion of all the questions listed under format, they will be in a position to finalize action plans during Lesson Plan No. 16.

4. Although group leaders will want to push members of their group to develop specific action plans before they leave the Institute, not all groups will be able to proceed at the same pace. If any group (or certain community in a group) is unable to develop the initial steps of a community involvement program while at the Institute, try to have them set a date when they will meet again to finalize plans.

LESSON PLAN NO. 14

COURSE TITLE:	Flood Hazard Management and Natural Resource Protection: The Coastal Setting
LESSON TITLE:	Issues on Public Participation TIME: 1 Hour

OBJECTIVE: To allow participants to focus on the issue and tools that influence the development of a successful public involvement program.

SCOPE: Specific issues and tools relating to effective public participation: goal setting, coalition building, bargaining and negotiation, communication skills, motivating the public.

FORMAT:

1. Concurrent workshops (4-5) on a range of public participation issues and/or tools. Participants select workshop topic of greatest interest to them.
2. Workshop leaders familiar with the particular tool or issue being addressed conduct group discussion.
3. Alternative workshop topics suggested here are:
   - Goal Setting;
   - Coalition Building;
   - Bargaining and Negotiation;
   - Communication Skills;
   - Motivating the Public.

REFERENCES:

1. Instructor:
   - a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapter VI.
   - b. Trainers' Manual, Lesson Plan No. 13 & 14, FEMA.

2. Participant:
   a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapter VI.
   b. Coastal Student Manual

REQUIREMENTS:

1. Sufficient break out rooms will be required for each of the workshops offered. There should be some flexibility permitted in the number, size and set up of these break out rooms to accommodate last minute changes.

2. The rooms should be set up for no more than 20 people.

REMARKS:

1. The list of workshop topics suggested here is by no means all inclusive but rather is offered as a sample of the kinds of issues that might be explored further in workshops. The Institute Director in conjunction with the Steering Committee should determine the actual list of workshop topics to be addressed during a particular Institute based on their assessment of the needs of the particular audience being targeted.

2. Participants should be asked to sign up for these workshops at Registration. The easiest way to do this is to have a separate sign-up sheet for each workshop indicating that 20 participants is the maximum for any workshop. The results will provide the Institute director with a good sense of which topics are of most interest to participants. Its conceivable that some topics may not generate sufficient interest to warrant a separate workshop but could easily be be incorporated into the discussion of another topic.

3. Workshop leaders who are individuals experienced in public participation will give a brief (5 minute) presentation on the particular issue or tool being discussed in the workshop, citing his or her own experiences.

4. Next the group leader will go around the room asking individuals to indicate what experience they've had with the particular issue or tool noting both positive and negative results.

5. Finally, the group leader wil
discussion, focusing on facto
either successful resolution
effective utilization of the
factors will be recorded on n
discussed in detail.

QUESTIONS TO BE CONSIDERED:

A. Goal Setting

1. Who in the community should be involv
setting of goals for a flood hazard m
program? How can or should broader c
goals be reflected?

2. How do you identify community goals?
techniques (questionaires, local work
referendum) are most useful? How can
ensure that the goals you identify in
reflect those of the entire community

3. What do you do in situations when som
seem to be in direct conflict? What
effective methods for achieving compr

B. Coalition Building

1. How can building a coalition help the
and implementation of a community flo
management program?

2. What interests should comprise your
How may these interests be identified

3. How does one identify the common inte
may bind a coalition?

4. What kinds of organizational decisio
help keep a coalition together?

5. What resouces, skills and outreach ab
various interest groups which might
coalition have which might be utilize
a comprehensive flood hazard managem

C. Bargaining and Negotiation

1. When is formal bargaining or negotiation useful?

2. How do you establish those points which are not negotiable? Those that are negotiable?

3. How do you identify tradeoffs that various groups may be willing to make to come to agreement?

4. How do you approach an opposing group on the subject of bargaining?

5. When is it useful to have a third party assist in the bargaining process?

6. What type of technical expertise might be required during a negotiation process?

7. If a third party negotiator is used, what skills should he/she have?

D. Communication Skills

1. What are some of the most effective means to reach the general public? (news media, public television) What basic message should be relayed to different publics?

2. How should materials be presented to the general lay audience? How can you translate complicated technical analysis into simple English?

3. How can you be sure your message is being received and clearly understood? What kinds of feedback mechanisms are appropriate?

E. Motivating the Public

1. How do you overcome initial public apathy or unawareness? What techniques could you use to "sell" your program to the public?

2. What are some of the causes of public apathy? How do you overcome them?

3. What are some examples of techniques which have worked in other communities?

4. How do you keep the public involved and interested?

LESSON PLAN NO. 15

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting

LESSON TITLE: Designing a Flood Hazard Management Program in Coastal Communities

TIME: 2.0 Hours

OBJECTIVES:

1. To examine in a realistic setting the factors that affect the opportunities for flood hazard management in coastal communities.
2. To examine the basic regulatory framework likely to result from community participation in the NFIP, and other Federal and State programs.
3. To examine the range of strategies and tools that might be linked together to develop a comprehensive flood hazard management program according to the appropriate flood hazard management stage.
4. To identify the economic and social interests that may be affected by alternative strategies.
5. To establish the tradeoffs that must be made by a community in designing a flood hazard management program.

SCOPE

Case study information on physical characteristics, population, flood problems, economic/social considerations, political context; present community maps and flood hazard areas; pre-flood and post-flood opportunities, goals development, legal institutional framework, specific strategies.

FORMAT:

1. Concurrent workshops. Participants divided into groups of 15-20 people.
2. Selected and trained facilitator leads group in discussion of case study materials.
3. In small groups, the facilitator asks participants to take 5 to 10 minutes to read the case study. Then facilitator will outline the objectives of the session and ask participants to introduce themselves.

4. Facilitator will pose the following questions to the group in the order shown:

   a. Who are the interests with a stake in flood hazard management?

   b. What is the nature of their stake?

   c. What needs of various interests will have to be met in order to obtain their support in meeting flood hazard management goals?

      Local government
      Low income
      Business
         Banker
         Real estate developer
         Salesman
         Industry/Land
         Water dependent/Water based industry
      Civic Leader
      Environmentalist

   d. What kinds of tradeoffs (economic/social/environmental/political) might various interests be willing to make?

   e. What kinds of strategies can be adopted to reflect these tradeoffs and to respond to the flooding problems of this community? In the pre-flood period? In the post-flood period?

   f. What are the likely impacts of various strategies on various interest groups? On community as a whole?

5. The preferred techniques to be used in addressing these questions is called small group brainstorming (see page 56). Using this technique, the facilitator goes around the room asking participants for their answers to the various questions and recording these answers on newsprint. Once all answers have been recorded, then the facilitator leads the group in a discussion of several of the questions beginning with question d and incorporating answers to questions a, b and c where appropriate.

6. After each question has been discussed, participants should be asked to spend a few minutes considering how the answer might differ in their community.

7. The attached Exercises D and E have been developed to help particpants address the questions regarding opportunities and strategies in the pre and post flood periods. The facilitator might ask participants to take 5-10 minutes to individually fill out charts listing some of the pre and post flood opportunities and specific strategies. The facilitator might then call on individuals to list the opportunities, strategies and stages to which they are applicable before moving on to a group discussion.

REFERENCES: 1. Instructor:

- a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters III, VII and VIII.
- b. Trainers' Manual, Lesson Plan No. 15, FEMA.
- c. Coastal Student Manual, FEMA.

2. Participant:

- a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters III, VII and VIII.
- b. Coastal Student Manual, FEMA.

REQUIREMENTS:

1. Sufficient break out rooms for several groups of 15-20 people.

2. Case study materials and worksheets on Oakton/Hampton County (found in Student Manual and in Appendix D of this manual). The Institute Director should carefully read this case study material prior to the Institute to determine whether or not it may need modification to best suit his/her particular region. (For example, for some parts of Texas and Louisiana, it might be appropriate to modify the case study to include reference to subsidence and delta problems whereas for parts of California the materials might be modified to reflect Pacific coastal problems such as landslides, tsuanamis, beach erosion, etc.)

3. Small group discussion leaders should be provided case study materials in advance and have read it thoroughly before this session.

4. Institute Director should conduct a special briefing for discussion leaders prior to the session. The briefing should include a review of the case materials, how to use them, how to conduct the session, what major point to focus on, etc. If the group leaders are not experienced as facilitators, the briefing session might include conducting a brief trial run of the session using facilitators as the audience and one of the director's staff as the facilitator. Following the trial run, the Director would conduct a critique of the session pointing out strengths and weaknesses. However, if the group leaders have had extensive experience conducting such sessions, this type of formal training may not be necessary.

REMARKS:

1. This session is one of the most important training sessions of the conference. There is a lot of material to cover, and group leaders will need to be quite organized in their approach to the session.

2. There are six questions (letter a-f) that must be addressed during the two hour session. When one includes 15 minutes for reading the case study and general introductions, this leaves approximately 17 minutes to solicit group answers and then discuss each question. Note, however, that several of the questions can be answered very quickly and others discussed simultaneously. We suggest that the facilitator spend no more than 5 minutes soliciting answers (brainstorming) to each question.

3. The most important concept that must be developed during this session is that of the tradeoffs that must be made to develop a program that satisfies many (not all) of the critical interests who must support it. Therefore, we suggest that the group discussion begin with question d while incorporating answers generated in questions a, b and c.

4. Don't get bogged down in the discussion of specific tools (e.g., PUD's vs. Transfer of Development Rights). Instead focus on overall strategies and the economic, social, political, and environmental impacts associated with each.

Exercise D

Use this chart to record the flood hazard management opportunities identified in the workshop discussion of the case example.

Potential Opportunities for Flood Hazard Management

	Pre-Flood Situation	Post-Flood Situation
Within 100-Year Floodplain Structures (Existing and Future) Undeveloped Land		
Outside Floodplain but within community		
Outside Community but within watershed		

Exercise E

Use this chart to record the results of the workshop discussion relating to possible strategies identified in the case example. Refer to chart in selecting the most appropriate strategies.

	Flood stage where most applicable			Affected Interests	Trade-offs
	Pre-Flood	During Flood	Post-Flood		
Strategy (tool)					

LESSON PLAN NO. 16

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting

LESSON TITLE: Final Small Group Discussions **TIME:** 1 Hour

OBJECTIVE: To complete discussion and development of follow-up plans.

SCOPE: Continued discussion of specific opportunities and strategies which should be implemented at the local and/or regional (state) level to improve flood hazard management identification of specific steps which participants intend to take following the Institute to achieve their goals.

FORMAT: Small group discussions. Groups divided according to geographic area. Completion of group discussion.

REFERENCES:

1. Instructor:
   - a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters III and VI.
   - b. Trainer's Manual, Lesson Plan No. 16, 3 & 12, FEMA.
2. Participant:
   - a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters III and VI.
   - b. Coastal Student Manual

REQUIREMENTS:

1. Sufficient break out rooms for small group sessions equipped with easels, newsprint and magic markers.

2. Group leaders should be instructed to summarize results of the group discussion on newsprint so that the sheets can be hung on the walls of the plenary session room prior to the start of the final session.

REMARKS:

1. Using same techniques applied in earlier small group sessions, group leader assists participants in completing specific follow-up plans which will begin to address the most important flood hazard management needs of the region as identified by participants. (see Lesson Plan No. 12)
2. Group leader will record planned follow-up activities or newsprint to be presented during closing session.

LESSON PLAN NO. 17

COURSE TITLE: Flood Hazard Management and Natura
Protection: The Coastal Setting

LESSON TITLE: Community Flood Hazard
Management: A Challenge
to Work Together

OBJECTIVES:

1. To give participants an opportun exchange information on planned activities.
2. To help participants achieve a s was accomplished by the program.
3. To relate planned follow-up acti to goals identified early in the

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SCOPE: Presentation and discussion of group plans, concluding remarks by worksho

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FORMAT:

1. Plenary session. Reports from discussion leaders. Concluding
2. Small group discussion leders ea minute presentation describing up plans, which will be taped on large room.
3. Following these presentations, director will open up discussion questions and comments, first on group plans and then on the work
4. Finally, workshop director or sp will give brief closing remarks, accomplishments of workshop and for continued participant invol their own communities.

REQUIREMENTS:

1. Large room set up for plenary session.
2. Follow-up plans developed by small groups taped to the walls of the room.

REMARKS:

1. You will want to keep small group reporters on a short timetable, as this part of the program can be dull if not done quickly.

2. The concluding speaker should be a good synthesizer who can listen to the small group reports and leave participants with a notion of what has been positively accomplished.

3. This would be an appropriate time to ask participants to fill out the Institute Evaluation forms provided in their student manuals or handed out at the session. (See Appendix F for sample Evaluation.)

LESSON PLAN NO. 18 (OPTIONAL)

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Coastal Setting

LESSON TITLE: Designing a Community Flood Hazard Mitigation Program: A Question of Trade-Offs — TIME: 3.5 Hours

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OBJECTIVE: 1. To help participants develop a comprehensive community flood hazard management program in a realistic context of legal, institutional, social and economic constraints.

SCOPE: Negotiation among interest groups for acceptable level of flood protection; local government action to implement specific strategies, assessment of flood related damages associated with particular level of flood protection.

FORMAT: Simulation role playing exercise: Within the Plenary session room, participants divide into 3 smaller groups, each representing a single community. Participants adopt various roles and become involved in discussion of various strategies to resolve their hypothetical community flooding problems.

REFERENCES:

1. Instructor:
    - a. Planning for Acts of God and Nature (PAGAN: Coastal or PAGAN: Riverine)
2. Participant:
    - a. Community Descriptions, Role Descriptions, Game Rules, Levels of Flood Protection, Damage Tables (Taken from PAGAN)

REQUIREMENTS:

1. Anyone planning to conduct the game should read through PAGAN very carefully to develop a good understanding of the rules and requirements and to determine how the game might be used for his/her particular group. A copy of both versions of PAGAN (Coastal and Riverine) is included in Appendix E of this manual.

2. The game theoretically can be run with as few as six or as many as 165 persons. However, the optimum run calls for about 55 players.
3. Game should be conducted in a large room with sufficient space to separate the communities and various wards within each community. Actual space requirements will obviously vary according to the size of the group.
4. The game requires approximately 3 hours to play and another 1/2 hour to debrief.
5. Participants should be allowed at least 15 minutes to read their materials. The game director should spend another 15 minutes explaining the rules and objectives of the game.

REMARKS

1. The game requires a substantial amount of time but can provide a very valuable learning experience. It is most appropriate for a group which has a good basic understanding of community flood hazard management. However, for an unsophisticated group it could also serve as a provocative introduction to some of the major issues to be considered.
2. The game can easily be conducted as an independent unit, totally separate from the rest of the training institute. In fact, it might appropriately serve as a follow-up activity which Institute participants could consider conducting in their own communities following their attendance at a training institute.
3. The game is extremely flexible and can accommodate a group ranging in size from 6-165 people. For a small group (6-40 people) the game should be conducted using only one of the three hypothetical communities. For groups larger than 40 the game can be expanded to include the additional two communities.
4. Simulation exercises such as PAGAN are designed to provide participants with a realistic learning experience.

As such they differ significantly from the standard lecture format of teaching. Consequently it is not uncommon for many people when first exposed to simulations to express serious reservations about "playing games." In our experience, if the game is run well, most people once involved in the simulation discover it to be an exciting, extremely insightful and in fact enjoyable experience. The most difficult job is convincing the reluctant ones to "give it a try."

However, we feel it's only fair to point out that simulation exercises, if conducted improperly, can result in an unplesant unproductive learning experience. Potential users of this simulation exercise should carefully consider a number of factors: (1) audience (How receptive or resistant are they likely to be to "games"?) (2) objectives (What do I want participants to learn from this session? Is the simulation the best way to accomplish this?); (3) Instructor (Is there someone qualified to administer the game, someone who understands the rules? Is he/she enthusiastic and can he/she quickly improvise if necessary to resolve any problems which may surface during the game?)

If the user determines that the audience is likely to be receptive to this type of exercise, that the hands on learning experience is a desirable objective, and that an experienced and/or confident game operator is available, then he/she can feel confident about using PAGAN.

B. Riverine Training Institute

The riverine training program does not differ significantly from the coastal training program with the exception of a few of the sessions: namely, Lesson Plan Nos. 3, 5 and 15. Therefore, we have not reproduced in this section complete version of the Riverine Program but instead included here only revised versions of Lesson Plans 3, 5 and 15.

Those of you wishing to conduct a training program in riverine communities need simply use the model Coastal Program outlined in this manual substituting Lesson Plans 3, 5 and 15 described here and making other necessary minor modifications to the remaining Lesson Plans. We suggest you read carefully through the coastal program identifying any changes that should be made to reflect riverine flooding situations. For example, in Lesson Plan No. 8 "The Federal and State Framework for Flood Hazard Management Decision Making", you will want to eliminate the discussion of the coastal zone management program. And in Lesson Plan No. 10 "Flood Hazard Management: Issues and Programs", you again should eliminate coastal zone management as a workshop topic and should also revise some of the workshop questions eliminating any references to predominantly coastal issues (e.g., building standards designed to prevent hurricane wind damage and elevation standards designed to include wave height considerations)

LESSON PLAN NO. 3

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Riverine Setting

LESSON TITLE: Flooding and Flood Hazard Management in Riverine Areas: An Overview

TIME: 1.5 Hours

OBJECTIVES:

1. Create participant understanding of inherent complexities of riverine flood hazard management.
2. To give historical perspective on riverine flood hazard management.
3. To address changing directions in riverine flood hazard management in response to the perceived weaknesses of the traditional approach.

SCOPE: An historical perspective on riverine flood hazard management, the traditional problem solving approach vs. new directions; why government policies are changing, how policies have changed and in what federal and state programs the new policies appear; watershed drainage concepts, ecologically sensitive areas, technical, social and economic difficulties of state and local governments.

FORMAT:

1. Plenary Session. Film, followed by round table discussion reacting to issues raised by film.
2. Resource people: Moderator, plus three discussants from different perspectives; i.e.,

   a) local government;

   b) environmentalist;

   c) disaster relief specialist;
3. Skilled moderator will lead the discussion by posing a series of questions to panel members.

REFERENCES:

1. Instructor:
   a. *Flood Hazard Management and Natural Resource Protection: Community Action Guide*, FEMA, Chapters I and II.
   b. Trainers' Manual, Lesson Plan No. 2
   c. Riverine Student Manual

2. Participant:
   a. *Flood Hazard Management and Natural Resource Protection: Community Action Guide*, FEMA, Chapters I and II.
   b. Riverine Student Manual

REQUIREMENTS:

1. Large room set up for plenary session.

2. The session will start with a dramatic film depicting riverine flooding and the tremendous damages resulting. The film used in the pilot training institute was a 1930's classic entitled "The River." It was produced by the Federal government and should be available from a number of sources including your local public library.

3. The film should be reserved well in advance of the Institute. The Institute Director should screen the selected film in advance to ensure its appropriateness.

4. Movie projector, screen (slide projector) should be reserved from conference center in advance.

5. Roundtable discussion will require that a table with a sufficient number of chairs and microphones be set up in front of the room. The table should allow discussants to look at each other.

REMARKS

1. The session is designed to expose participants to the major problems and issues of riverine flood hazard management as they bear on state and local governments. It is intended as an overview and *not* a comprehensive treatment. Panel members should be informed that they will not be expected to deliver any formal remarks but rather to answer specific questions from their particular perspective. The questions should be sent to panel members at least two weeks prior to the Institute.

2. Prior to this session, the director should bring panel members together to review once more the objectives of the session to preview the film and to develop a strategy for eliciting responses from panel members.

3. The director should provide panel members with a copy of the Resource Manual ahead of time and ask them to read Chapters I and II in preparation for their session.

4. The director should carefully brief the moderator on his/her role, stressing the importance of keeping responses brief and to the point, ensuring that all members of the panel have a fair opportunity to express their views, that the audience has ample opportunity to ask qustions and that the session begins an ends on time.

5. This film selected for the Riverine Model Program offers an historical perspective on the causes and results of flooding along the Mississippi River and is particularly appropriate for areas in the mid-West. However, those conducting Institutes in other regions of the country may want to use another film. If you feel that the film described above is not likely to be appropriate, you should begin analyzing alternatives early in the Institute planning process. The steering committee may be very helpful in identifying appropriate films. Do not plan to use a film that you have not personally screened to make certain it meets the objectives of this section of the Institute.

QUESTIONS TO BE CONSIDERED:

1. What are the special problems of protecting the riverine floodplain? (Dynamic nature of riverine floodplain, fragility of riverine ecosystem.)

2. What is the relationship of watershed and drainage management to riverine flooding problems?

3. What are some of the economic and social factors which contribute to the development of floodplains?

4. What are the weaknesses of traditional approaches to riverine flood hazard management?

5. What are the changing directions in our current approach to riverine flood hazard management?

LESSON PLAN NO. 5

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Riverine Setting

LESSON TITLE: The Nature of Flooding in Riverine Communities and the Special Role of Riverine Ecological Resources in Flood Hazard Mitigation

TIME: 2 Hours

OBJECTIVES:

1. To assist participants in identifying and understanding the causes of flooding and the nature of flood hazards in their community.
2. To help participants understand the functioning of important riverine ecosystems for hazard mitigation purposes.
3. To familiarize participants with various uses of natural resource data and maps as community planning and decision-making tools.

SCOPE: Description of special ecological characteristics and hazard mitigation functions of natural riverine systems (wetlands, transition zones, river corridors) Presentation of land use suitability concepts. Hands on experience utilizng natural resources maps as decision-making tools.

FORMAT:

1. Small group discussion sessions of 15-25 people.
2. The session, if possible, should be directed by a discussion leader who is someone other than the resource person presenting the mini-lecture.
3. An appropriate resource person will give a 15-minute "mini-lecture" using whatever audio-visuals they choose. Their presentation should address (a) the nature of flooding problems in communities located in one of these three areas, and (b) the role played by ecological resources of these communities in moderating the hazard.
4. Following the "mini-lecture", the discussion leader will answer questions from the audience regarding their own community situations and

explore with them special ecological resources they might consider protecting in their communities.

5. After approximately 50 minutes the workshop leader should call for a 10-minute break during which he/she will spread out the mapping materials on the tables. Participants should be encouraged to stay in the room so as not to lose any time.

6. Next the leader will give a brief presentation (5-10 minutes) highlighting the use of land suitability as a planning tool. In his/her presentation the leader will briefly describe the land suitability analysis process involving (1) the identification of environmental considerations or elements, (2) interpretation of this data on resource by resource basis through the application of management principals to determine resource limitations, (3) the mapping of eacn resource variable on a common scale, and (4) the overlaying of variables to form an environmental composite or suitability map.

7. Finally, participants will have the opportunity for some actual experience working with mapping materials especially prepared for this session. Materials will include (a) U.S.G.S. quad sheet for a typical community type in that region (b) several mylar overlays depicting flood hazards, soils, wetlands, zoning and current land use, (c) a clear acetate sheet which participants can mark on with grease pencils, (d) handout describing materials and symbols displayed on maps.

8. How these materials are used in the exercise will depend on the sophistication of the group members. Therefore beginning this final session the leader should find out from workshop participants what experience they've had with maps.

9. If the group is relatively unfamiliar with land use suitability analysis the workshop leader should start off by directing participants to take the U.S.G.S. quad sheet and then overlay the flood hazard mylar to identify the 100-year flood boundaries. Next they might overlay the soils mylar and identify those areas suitable for development with and without

septic tanks and then compare t to the current zoning overlay n sistencies. Finally, they coul process with the other mylar ov noting inconsistencies with cur and/or zoning.

10. If the group is more sophistica the discussion might focus on m policies which the community mi (based on existing data) to cor ceived problems or what additio needs existed and how they migh

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REFERENCE: 1. Instructor:
   a. Flood Hazard Management and Resource Protection: Commun Guide, FEMA, Chapter II.
   b. Riverine Student Manual.
   c. Trainers' Manual, Lesson Pl Appendix B.

2. Participant:
   a. Riverine Student Manual.
   b. Flood Hazard Management and Resource Protection: Commun Guide, FEMA, Chapter II.

REQUIREMENTS: 1. Concurrent workshops should to address the range of dis ecosystems and subsequent f lems existing in a particul area. Examples of distinct systems includes: U-shaped with moderate flood plains, river valleys with narrow f dry wash areas, areas susce slide, etc. The Institute assistance from his/her ste should identify those river common to their particular region. Most regions will one, possibly two of these However, in some parts of t (e.g., California), it may address several of these ec separate workshops.

2. If more than one riverine ecosystem will be addressed in these workshops, then participants should be asked to sign up prior to the Institute for the workshop topic which most closely matches their geographic, ecologic conditions. This will provide the Institute Director with a good sense of how many workshops of each type to organize. If the Institute Director is familiar with the geographic/ ecologic conditions of each of the communities invited to the Institute he/she can assign individuals to the most appropriate workshops.

3. If only one riverine ecosystem will be addressed in these workshops, then the Institute Director at registration should assign participants to these sessions to ensure an approximately equal balance of participants in each.

4. The optimal workshop size for these sessions is 15-20 participants. The Institute Director should ensure that sufficient qualified resource people are available to enable the Director to keep keep these workshops to the optimal size. Qualified resource people might include scientists, natural resource planners or other individuals with a good understanding of various types of riverine ecologic systems. These resource people may also serve as workshop discussion leaders or the Institute Director may choose to appoint someone else as official discussion leader.

5. There should be sufficient breakout rooms to accommodate the number of workshops planned. Each breakout room should contain 2 tables and sufficient chairs to accommodate 15-20 people. Each should be equipped with an easel, newsprint and magic markers and 2-3 copies of the mapping materials (community base maps and natural resource overlays) to be used in this session. Workshop rooms should also contain any audio-visual equipment (slide projectors, overhead projectors, screens, etc.) requested by the workshop leaders.

REMARKS:

1. Once again the Institute director will need to evaluate the mapping tools provided with his trainers' manual to determine whether or not the maps are appropriate teaching tools for this audience. Keep in mind that the purpose of the mapping exercise is to familiarize the participants with the type and use of maps. The maps used for the exercise need not match exactly with the type of flood hazard problems reflected by communities participating in the Institute. On the other hand, if the types of natural resources are dramatically different than those reflected in the maps provided, the exercise map may be more useful if revised.

2. The actual experience of participants using maps to discover the manner in which community development patterns and flood hazard mitigation strategies fit together is an important part of this exercise. When the mapping exercise is utiized the group should organize into two smaller groups, each standing around a table with the mapping materials on it (see blue lines of mapping materials, appendix B). The interaction of the participants as they work together to answer questions for the mapping exercise (see briefing memorandum, Lesson Plan No. 5, Appendix B,) is an important part of the learning experience.

3. If the Institute Director decides that he needs to develop a new set of mapping materials around a geographic area with resources, opportunities, and flood problems more common to participating communities, he will wish to:

   - Select an area which has had a variety of natural resource maps completed and for which a Flood Insurance Rate Map has been completed. The area should be partly, but not fully, developed so that the exercise can be used to discuss future opportunities as well as current problems.

- Select and obtain a base map (usually a U.S. Geological Survey quad sheet) of an appropriately large scale--not less than 1:24,000--containing both natural features and development patterns.

- Select natural resource maps and land use maps useful for analysis of the interactions between development, flood hazards and natural resources. The maps used in the exercise described in this manual include:

  -- Soils map;

  -- Wetlands map;

  -- Zoning map;

  -- Development map; and

  -- Floodway/flood boundary map developed from a Flood Insurance Rate Map.

- The natural resource and land use maps selected to overlay the base map should be redrawn onto mylar overlays and, of course, put on the same scale as the base map.

- University geography or environmental studies departments may be the best source of assistance in identifying possible communities to serve as the model for this exercise. They may also be able to supply a graduate student who can inexpensively redraw and rescale the map overlays.

4. Blue line copies of the maps prepared for this riverine institute are included in Appendix B. Reproduction copies of these materials can be obtained from the FEMA office in Washington, D.C. Training and Education Division.

5. The workshop handout materials included in Appendix B are designed to be part of the Student Manual.

QUESTIONS TO BE CONSIDERED:

1. What are the special ecological areas comonly found within river corridors?
2. Where, within the river corridor, do they commonly occur? In what associations?
3. What role do each of these resources play in flood hazard mitigation?
4. How sensitive are these resources to the activities of man?
5. How can these resources be protected? What management policies should be applied?
6. What is meant by a land suitability analysis?
7. How does such an analysis help identify flood hazard mitigation/resource protection opportunities?
8. What role does resource mapping play in this analysis?
9. What type of resource and maps exist or may be available for my community? From what sources?
10. What environmental factors or values are most important in my community?
11. What is a suitable map base on which to represent these factors?

LESSON PLAN NO. 15

COURSE TITLE: Flood Hazard Management and Natural Resource Protection: The Riverine Setting

LESSON TITLE: Designing a Flood Hazard Management Program in Riverine Communities

TIME: 2.0 Hours

OBJECTIVES:

1. To examine in a realistic setting the factors that affect the opportunities for flood hazard management in riverine communities.
2. To examine the basic regulatory framework likely to result from community participation in the NFIP, and other Federal and State programs.
3. To examine the range of strategies and tools that might be linked together to develop a comprehensive flood hazard management program according to the appropriate flood hazard management stage.
4. To identify the economic and social interests that may be affected by alternative strategies.
5. To explore the range of public participation techniques which would be useful when selecting and implementing a comprehensive community flood hazard management program.
6. To establish the tradeoffs that must be made by a community in designing a flood hazard management program.

SCOPE: Case study information on physical characteristics, population, flood problems, economic/social considerations, political context; present community maps and flood hazard areas; pre-flood and post-flood opportunities, goals development, legal institutional framework, specific strategies.

FORMAT:

1. Concurrent workshops. Participants divide into groups of 15-20 people.
2. Selected and trained facilitator leads group in discussion of case study materials.

3. In small groups, the facilitator asks participants to take 5 to 10 minutes to read the case study. Then facilitator will outline the objectives of the session and ask participants to introduce themselves.

4. Facilitator will pose the following questions in the order shown:

    a. Who are the interests with a stake in flood hazard management?

    b. What is the nature of their stake?

    c. What needs of various interests will have to be met in order to obtain their support in meeting flood hazard management goals?

        Local government
        Low income
        Business
            Banker
            Real estate developer
            Salesman
            Industry/Land
            Water dependent/Water based industry
        Civic Leader
        Environmentalist

    d. What kinds of tradeoffs (economic/social/environmental/political) might various interests be willing to make?

    e. What kinds of strategies can be adopted to reflect these tradeoffs and to respond to the flooding problems of this community?

    f. What are the likely impacts of various strategies on various interest groups? On community as a whole?

5. The preferred techniques to be used in addressing these questions is called small group brainstorming (see page 56). Using this technique, the facilitator goes around the room asking participants questions and recording these answers on newsprint. Once all answers have been recorded, then the facilitator leads the group in a discussion of several of the questions beginning with question d but incorporating answers to questions a, b and c where appropriate.

6. After each question has been discussed, participants should be asked to spend a few minutes considering how the answer might differ in their community.

7. The attached Exercises D and E have been developed to help participants address the questions regarding opportunities and strategies in the pre- and post-flood periods. The facilitator might ask participants to take 5-10 minutes to individually fill out charts listing some of the pre- and post-flood opportunities and specific strategies. The facilitator might then call on individuals to list the opportunities, strategies and stages to which they are applicable before moving on to a group discussion.

REFERENCES

1. Instructor:
   a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters III, VII and VIII.
   b. Trainers' Manual, Lesson Plan No. 15, FEMA.
   c. Riverine Student Manual, FEMA.

2. Participant:
   a. Flood Hazard Management and Natural Resource Protection: Community Action Guide, FEMA, Chapters III, VII and VIII.
   b. Riverine Student Manual, FEMA.

REQUIREMENTS:

1. Sufficient break out rooms for several groups of 15-20 people.

2. Case study materials and worksheets on Rowlett Creek (found in Student Manual and in Appendix D of this manual). Prior to the Institute, the Institute Director should carefully read this case study material prior to the Institute to determine whether or not it may need modification to best suit his/her particular region. (For example, in parts of California and Arizona, the materials might be modified to include dry wash flooding conditions.)

3. Small group discussion leaders should be provided case study materials in advance and have read it thoroughly before this session.

4. Institute Director should conduct a special briefing for discussion leaders prior to the session. The briefing should include a review of the case materials how to use them, how to conduct the session, what major points to focus on, etc. If the group leaders are not experienced facilitators, the briefing session might include conducting a brief trial run of the session using facilitators as the audience and one of the director's staff as the facilitator. Following the trial run, the Director would conduct a critique of the session pointing out strengths and weaknesses. However, if the group leaders have had extensive experience conducting such session, this type of formal training may not be necessary.

REMARKS:

1. This session is one of the most important training sessions of the conference. There is a lot of material to cover and group leaders will need to be quite organized in their approach to the session.

2. There are six questions (letter a-f) that must be addressed during the two hour session. When one includes 15 minutes for reading the case study and general introductions, this leaves approximately 17 minutes per question.

   Note however that several of the questions can be answered very quickly and others simultaneously. We suggest that the facilitator spend no more than 15 minutes soliciting answers (brainstorming) to each question.

3. The most important concept that must be developed during this session is that of the tradeoffs that must be made to develop a program that satisfies many (not all) of the critical interests who must support it. Therefore we suggest that group discussion begin with question d while incorporating answers generated in questions a, b and c.

4. Don't get bogged down in the discussion of specific tools (i.e., PUD's vs. Transfer of Development Rights). Instead focus on overall strategies (i.e., the portion of density tradeoffs) and the economic, social, political, and environmental impacts associated with each.

EXERCISE D

Use this chart to record the flood hazard management opportunities identified in the workshop discussion of the case example.

Potential Opportunities for Flood Hazard Management

	Pre-Flood Situation	Post-Flood Situation
Within 100-year Floodplain Structures (Existing and Future) Undeveloped Land		
Outside Floodplain but within community		
Outside Community but within watershed		

EXERCISE E

Use this chart to record the results of the workshop di
relating to possible strategies identified in the case
Refer to chart in selecting the most appropriate strate

	Flood stage where most applicable			Affected Interests
	Pre-Flood	During Flood	Post-Flood	
Strategy (tool)				

APPENDIX A

SAMPLE INVITATION LETTERS, BRIEFING MEMOS

SAMPLE INVITATION LETTERS

TO SCHOLARSHIP PEOPLE:

Dear

I am pleased to invite you to participate in a three-day Flood Hazard Management Training Institute to be held from 12:00 noon Sunday, May 18 to 4:30 p.m. on Tuesday, May 20. This Institute, for participants from Ohio, Indiana, Michigan, Illinois, Wisconsin and Minnesota is one of two pilot conferences in the country. Over 120 citizen leaders from this region are being asked to attend.

The purpose of the Institute is to develop local leadership for public participation in designing and implementing a community flood hazard management program. Citizen leaders will learn about flood boundary mapping, design of community flood hazard mitigation programs, the National Flood Insurance Program, the role of ecological resources in flood hazard mitigation, and public participation techniques in flood hazard management.

Every participant has been carefully selected on the basis of several criteria, including an interest in creative floodplain management, an economic interest in floodplain management, a role as a civic leader, elected official or engineer and the potential for influencing and further educating others in the community. Active future involvement in the planning for flood hazrd mitigation is a critical factor in consideration of participants.

You have been recommended as an individual who meets these criteria for Institute participation. As an active [environmentalist, civic leader, local official] you will, I believe gain a great deal from this Institute. One major focus of the sessions will be the key role which natural resources can play in flood hazard mitigation. This is an important mesage to convey to local community leaders and environmental activists like you are perhaps best suited to make this point. I do hope you will be able to accept this invitation to attend. As I'm sure you will understand, we consider it important that Institute participants commit themselves to be present throughout the scheduled activities from Sunday noon through Tuesday afternoon.

Limited scholarship funds are available to cover the expenses of those individuals who might otherwise be unable to attend the Institute. If you will require financial assistance please so indicate on the attached Registration Form. Any contribution which you or your organization can make towards your expenses will enable us to stretch scholarship funds to include other worthy participants.

Necessary transportation will be provided, free of charge, between the newly renovated Illinois Beach Resort (see enclosed brochure) and Chicago's O'Hare airport at 11:00 a.m. and 1:00 p.m. on Sunday and at 5:30 p.m. on Tuesday.

I am enclosing a preliminary program, fact sheet and a registration/information form. Please return the form and a check for an appropriate amount to me before April 21.

If you have any questions, please call or write me or one of the members of the Regional Advisory Committee listed on this stationary. I hope you will be able to be with us at the Institute.

Sincerely,

REGISTRATION FORM (SENT ONLY TO THOSE ELIGIBLE FOR SCHOLARSHIPS)

Mail to: Richard L. Robbins, Regional Coordinator,
Lake Michigan Federation, 53 W. Jackson Blvd., Suite 1710
Chicago, IL 60604

Name ______________________________

Organization ______________________________

Preferred Mailing Address ______________________________

City ____________________ State __________ Zip ________

Phone ______________ Daytime ______________ Evening

There is no registration fee associated with the Institute. A charge of $85.40 covers luncheons and dinners from Sunday noon through Tuesday afternoon, accommodations for two nights, double occupancy, information materials, and the Institute Training Manual. Limited single occupancy is available at $20.90 additional for the two nights.

REQUEST FOR FINANCIAL ASSISTANCE

_____ I would like to attend the Institute, but can only do so with the amount of financial assistance requested below:

Conference fee (Room and board)	$85.40
Round trip transportation costs (from ______________ to O'Hare)	________
Total costs of Institute attendance	________
Less my (or my organization's) contribution	________
TOTAL ASSISTANCE REQUESTED	________

_____ I would like to share a room with ____________________

_____ I would like to have a roommate assigned.

I ____ do/_____ do not smoke.

I ____ am/_____ not willing to share my room with a smoker.

_____ I will need transportation from the Chicago airport. My flight arrives at O'Hare on __________ at __________.
(Date) (Time)

_____ I plan to drive to the Institute and would be willing to take a passenger.

TO GENERAL ATTENDEES:

Dear

I am pleased to invite you to participate in a three-day Flood Hazard Managment Training Institute to be held from 12:00 noon Sunday, May 18 to 4:30 p.m. on Tuesday, May 20. This Institute, for participants from Ohio, Indiana, Michigan, Illinois, Wisconsin and Minnesota is one of two pilot conferences in the country. Over 120 citizen leaders from this region are being asked to attend.

The purpose of the Institute is to develop local leadership for public participation in designing and implementing a community flood hazard management program. Citizen leaders will learn about flood boundary mapping, design of community flood hazrd mitigation programs, the National Flood Insurance Program, the role of ecological resources in flood hazard mitigation, and public participation techniques in flood hazard management.

Every participant has been carefully selected on the basis of several criteria, including an interest in creative floodplain management, an economic interest in floodplain management, a role as a civic leader, elected official or engineer and the potential for influencing and further educating others in the community. Active future involvement in the planning for flood hazard mitigation is a critical factor in consideration of participants.

Participants in the Institute will include planners, local government officials, bankers, insurance experts, developers and real estate agents, appraisers, Red Cross and Civil Defense officials, consulting engineers, environmentalists and other concerned citizens.

You have been recommended as an individual who meets these criteria for Institute participation. As a concerned citizen and local taxpayer, you stand to benefit considerably from an improvement in your communities flood hazard management program. For flooding carries with it tremendous costs not only to the flood victims but also to all community taxpayers who must pay the costs to repair public roads and utilities and to cover emergency police and rescue services.

The training institute will provide you with an opportunity to explore alternative strategies to improve community flood hazard management progrms. I do hope you will be able to accept this invitation to attend. As you will I'm sure understand, we consider it important that Institute participants commit themselves to be present throughout the scheduled activities from Sunday noon through Tuesday afternoon.

Necessary transportation will be provided, free of charge, between the newly renovated Illinois Beach Resort (see enclosed brochure) and Chicago's O'Hare airport at 11:00 a.m. and 1:00 p.m. on Sunday and at 5:00 p.m. on Tuesday.

I am enclosing apreliminry program, fact sheet and a registration/ information form. Please return the form and a check for an appropriate amount to me before April 21.

If you have any questions, please call or write me or one of the members of the Regional Advisory Committee listed on this stationary. I hope you will be able to be with us at the Institute.

Sincerely,

REGISTRATION FORM

Mail to: Richard L. Robbins, Regional Coordinator,
Lake Michigan Federation, 53 W. Jackson Blvd., Suite 1710
Chicago, IL 60604

Name ______________________________

Organization ______________________________

Preferred Mailing Address ______________________________

City ____________ State ____________ Zip ________

Phone ____________ Daytime ____________ Evening

There is no registration fee associated with the Institute. A charge of $85.40 covers luncheons and dinners from Sunday noon through Tuesday afternoon, accommodations for two nights, double occupancy, information materials, and the Institute Training Manual. Limited single occupancy is available at $20.90 additional for the two nights.

I plan _____ or do not plan _____ to attend the Institute.

I enclose a check for $85.40 ($106.30 single) made payable to the Lake Michigan Federation. ____________________

NOTE: All payments should be received before April 21.

_____ I would like to share a room with ____________________

_____ I would like to have a roommate assigned.

I _____ do/ _____ do not smoke.

I _____ am/ _____ am not willing to share my room with a smoker.

_____ I will need transportation from the Chicago airport.
My flight arrives at O'Hare on __________ (Date) at __________ (Time) .

_____ I plan to drive to the Institute and would be willing to take a passenger.

TO SPEAKERS

Dear

I am delighted you will be able to speak at the three-day Flood Hazard Management Training Institute to be held from 12:00 noon Sunday, May 18 through 4:30 p.m. Tuesday, May 20.

The time and topic of your presentation are described below. A copy of the program, fact sheet and other materials are enclosed.

The Flood Hazard Management Training Institute is one of two pilot conferences in the country which is designed to develop local leadership for public participation in planning and implementing a community flood hazard management program.

Our Midwest Institute for the states of Ohio, Indiana, Michigan, Illinois, Wisconsin and Minnesota will be held at the newly renovated Illinois Beach Resort along Lake Michigan in Zion, Illinois.

The Institute will focus on flood boundary mapping, design of community flood hazard mitigation programs, the National Flood Insurance Program, the role of ecological resources in flood hazrd mitigation, and public participation techniques in flood hazard management.

Expected participants include over 120 people (20 from each state). These will consist of planners, local government officials, bankers, insurance experts, developers and real estate agents, appraisers, Red Cross and Civil Defense officials, consulting engineers, environmentalists and other concerned citizens.

Two groups are co-sponsoring the Institute. The Conservation Foundation is a national non-profit research and communication organization dedicated to the wise use of resources. The Lake Michigan Federation is a four state citizens supported, environmental agency, concerned with water quality.

Please fill in the enclosed registration form telling us when you will arrive and depart, audio-visual, and other equipment needs. Please attach a personal vitae and return to the Lake Michigan Federation before April 21.

We will be holding a briefing session for all workshop leaders, speakers, and moderators at 1:00 p.m. on Sunday to review the goals and objectives of each particular session. Each resource person should plan on attending this session or allotting time before their particular session to discuss details of the program and their specific roles. The Sunday afternoon briefing is particularly important for those resource persons involved in the Monday afternoon workshops.

Necessary transportation will be provided, free of charge, between the newly renovated Illinois Beach Resort (see enclosed brochure) and Chicago's O'Hare airport at 11:00 a.m. on Sunday and at 5:30 p.m. on Tuesday.

Thanks again for your interest.

We will send you training materials provided to all participants at the Institute as they are available. Please review them in your area of presentation.

Your presentations include:

Sincerely,

SPEAKERS REGISTRATION FORM

Name ____

Title ____

Organization ______________________________________

Address ____

City __________________ State ______________ Zip ____________

Phone ____________________ Daytime ___________________Evening

I will be arriving at the Institute at ___________ on ___________
(Time) (Date)

and will be leaving at ________________ on ______________.
(Time) (Date)

Please provide me with the following meals (circle those applicable.

D Sunday
L D Monday
L Tuesday

and a double room for the following nights (circle those applicable):

Sunday Monday

A single room will cost you or your agency $10.45 per night extra.

I will need the following audio-visual equipment:
____

Please attach a personal vitae or a short six-line description of your background which is suitable for incorporation into the program for the Institute.

Please return the registration form, personal vitae, and appropriate payment to the Lake Michigan Federation before April 21. The fee for double occupancy is $42.70 ($53.15 single per day) and include one luncheon and one dinner. The cost for any portion of the above package will be computed at your request.

Please mail to: Richard L. Robbins, Regional Coordinator,
Lake Michigan Federation,
53 W. Jackson Blvd., Suite 1710,
Chicago, IL 60604

SAMPLE BRIEFING MEMO

TO PANEL MEMBERS "FLOODING AND FLOOD HAZARD MANAGEMENT IN COASTAL AREAS: AN OVERVIEW"

Thank you for agreeing to serve as a panel member in the session on Sunday evening May 11 during the Region IV Coastal Flood Hazard Management Training Institute.

The purpose of this introductory session is to provide participants with an understanding of the serious threat caused by coastal flooding as well as the inherent complexities of coastal flood hazard management. In this session, we hope to explore the perceived weaknesses of traditional approaches to flood hazard management and possible alternative, more effective solutions.

The session will begin with a one-half hour film entitled "A Lady Named Camille" which vividly illustrates the devastating impacts of a major hurricane and raises some important questions concerning human occupation of coastal high hazard areas. The film is intended to set the stage for the panel discussion which will follow immediately.

We are not asking panel members (who will include individuals from both the private and public sectors with considerable experience/expertise relating to coastal flood hazards) to deliver any prepared remarks. Rather we will ask that you participate in a roundtable discussion of key questions raised by either the moderator or members of the audience, drawing upon your own personal experiences.

A list of questions which might be addressed during this session is attached. Please review these in preparation for your roundtable discussion. Also attached is a list of panel members including their addresses and phone numbers in the event you'd like to contact any of them prior to the institute.

You should refer to the detailed program which you received earlier to get a good sense of how this session fits into the overall program. Also, you may find the background reading materials ("Community Action Guide Summary") which you'll be receiving shortly in the mail helpful in preparing for this session.

TO PANEL MEMBERS "FLOODING AND FLOOD HAZARD MANAGEMENT IN COASTAL AREAS: AN OVERVIEW"

We would like to meet with all of you immediately prior to this session to once more review the objective of the session and to answer any questions. The best opportunity to do this will probably be during dinner Sunday evening. We will confirm the exact time and place of this meeting at registration.

We look forward to meeting all of you and once again, thanks for agreeing to contribute to this most important training institute.

TO PANEL MEMBERS "THE ROLE OF PUBLIC PARTICIPATION IN COMMUNITY FLOOD HAZARD DECISION MAKING

Thank you for agreeing to serve as a panel member in the Monday morning session (9:45-10:45 a.m.) during the Region IV Coastal Flood Hazard Management Training Institute.

The purpose of this session is to establish the importance of involving the public in developing a community flood hazard management program. The format will involve a one-half hour speech followed by a roundtable (panel) discussion of specific questions raised by the moderator and members of the audience.

Dan O'Connell of the FAU/FIU Joint Center in Florida will deliver the opening speech. He will discuss some of the positive benefits resulting from effective public involvement and identify some of the key decision-points where public input could be most valuable. He will also talk about means to achieve effective public participation as well as some possible criteria for evaluating the success of a public participation effort.

Following his speech, Mr. O'Connell will sit down with other panel members (representing a diverse range of interests) to answer questions posed by the moderator. The audience will also be encouraged to ask questions.

The purpose of the roundtable discussion will be to elaborate on points made during the speech, and to elicit from other panel members new information or differing views about public participation. Panel members will not be asked to deliver any prepared remarks. Instead you will be asked to respond to specific questions based on your own experiences.

You should refer to the detailed program which you received earlier to give you a good sense of how your session fits into the overall program. We've attached a list of the type of questions we hope will be addressed during this session, either in the opening speech or follow-up discussion period. You should find these useful in preparing for your session. Also attached is a list of panel members including addresses and phone numbers, should you wish to contact anyone prior to the institute. The background reading materials ("Community Action Guide") which you will be receiving shortly in the mail should also be helpful to you in preparing for this session.

TO PANEL MEMBERS "THE ROLE OF PUBLIC PARTICIPATION IN COMMUNITY FLOOD HAZARD DECISION-MAKING

We would like to meet with all of you participating in this session sometime during the institute to once more review the objectives of the session and to answer any questions. Probably sometime on Tuesday evening will be most convenient. We will try to confirm an exact time and place for this meeting at registration on Sunday.

Once again, thank you for agreeing to participate in this very important training institute. We look forward to meeting you on May 11.

APPENDIX B

MAPPING EXERCISE MATERIALS

(COASTAL)

SAMPLE BRIEFING MEMORANDUM

To: Workshop Leaders "Identifying Natural Resources and Flood Hazard Data Sources For Decision-making"--"Mapping Exercise"

Thank you for agreeing to serve as a workshop leader for the Sunday, May 18, evening session (7:45-9:15 a.m.) during the Region IV Coastal Flood Hazard Management Training Institute.

The workshops you will be leading represent an important element of the training program. The purpose of this session is two fold: (1) to describe the special ecological characteristics and hazard mitigation functions of coastal ecosystems, (2) to familiarize participants with several types of maps commonly available to communities and to increase participant appreciation for the use of maps as essential flood hazard mitigation planning tools.

The session will be divided into two parts. During the first hour, group discussion will focus on coastal ecosystems and the special role natural resources can play in hazard mitigation. You should begin the session by giving a brief 20-25 minute presentation using slides or any other visuals you may find useful in your talk. You should highlight the causes of flooding and flood damage in a particular geographic area and describe the special qualities of typical coastal ecosystems such as beaches and oceans, tidal rivers, and/or estuaries. You will also want to point out what role these natural resources can play in reducing flood hazards. Following your presentation, you should answer questions from the audience.

At approximately 10 minutes before the first hour is up you should close discussion and give participants a brief break but encourage them to stay in the room. During this break you should distribute the mapping materials on the tables in preparation for the next portion of the session.

During the second part of this session you will be leading the group in mapping exercise on land use suitability. You should begin this portion of the session with a very brief (5-10 minute) presentation on the principles of land use suitability analysis. A land suitability analysis is a process of data gathering, interpretation, and representation which results in a land clasification scheme reflecting the natural suitability or carry capacity of the land. The analysis is a stepped process involving: the identification of environmental considerations or elements (this identification could be based on the material discussed in a preceeding session on the nature of flooding and the role of ecological resources in flood hazard mitigation); the interpretation of this data (on a resource by resource basis) through the application of management principals to determine its limitations (a typical soils interpretation tables is an example of this); the mapping of each resource variable (on a common scale); and finally the overlaying of variables to form an environmental composite or suitability map.

Several important questions and considerations about community mapping should be raised as part of your initial group presentation. These questions include:

1. What is a suitable community base map? (scale and availability)
2. What environmental factors or values are of particular importance to the community (i.e., septic tank siting, hazard mitigation, etc.) What is the purpose or goal for the mapping project?
3. What technique, medium, or materials are most appropriate to use in representing this information? How much will it cost?

For the remaining 50 minutes of the session participants will break into small groups (10-15 people) to "work" with a set of maps and map overlays. Your role should be to guide the discussion and to see that important features on the maps are discussed.

Remember that your group will consist of local officials, citizen activists and business leaders. Since the group's familiarity with maps will vary greatly, it would be most appropriate to keep the discussion basic.

Each group will be provided with two sets of maps. Each set will consist of: a U.S.G.S. quad sheet; 3 clear mylar overlays (flood hazards, soils, and land use); and a set of aerial photos, from two different years, showing development in the region. Acetate and markers will be provided to allow participants to color or highlight features or soil types on the maps. (For example, you might want to consider having participants group and color soil types based on their suitability for development.) During the session we would like you to move the group towards a suitability analysis, using these maps.

Enclosed you will find blue line copies of these mylar overlays; key to the maps, and interpretation of soil types. Also atached you will find a list of "features of interest" and questions that you may wish to address during the session. At the Institute, participants will receive a handout which introduces: different types of maps; map scale; topographic lines; and a key of U.S.G.S. map symbols; and general detailed description of the soil survey; a more detailed interpretation of soil types appearing on the overlay.

We would like to meet with you and the other workshop leaders at about 7:15 p.m. on Sunday to once more review the objectives of the session and to answer quetions. Attached is a list of the other workshop leaders including their addresses and phone numbers. You might want to contact other workshop leaders prior to the institute to exchange ideas. We will let you know the exact time and location of that meeting at registration.

Once again, thank you for agreeing to serve as a workshop leader in this most important training institute. We look forward to meeting you on May 18.

GEORGETOWN SOUTH, S.C.

The Georgetown South quadrangle is the base map on which overlays depicting wetlands zoning, flood hazards and soil types will be placed. This quad sheet should be viewed as part of an entire coastal system. The quads to the south and east will be available at the institute and an effort to link the estuary system represented on the Georgetown South quad with the ocean, beach, barrier island, and dune systems on the other quads should be made.

Features of Interest:

- symbols of the USGS map;
- wetlands and marshes (fresh, brackish and salt);
- spoil islands;
- port and shipping channels;
- lack of contour, and the use of benchmarks to show elevations;
- heavy and light industry and associated infrastructure;
- jetties and their affects (land aggrading to the east); and
- estuary fed by a tidal river.

Questions to consider:

- What type of development is occurring in the area (depicted in purple)?
- What are some of the possible effects of this development (much of the development has occurred within floodprone areas)?
- What role do the wetlands and marshes play in this region? What could be some of the potential effects if these resources are degraded?
- How do the vegetated dunes and barrier islands (eastern quad sheet) influence the flood potential in the estuary?
- What are the major soil types? What are the natural limitations of these soils?
- How does the soil survey help in identifying floodprone areas?

BASE MAPS [1]

There are three categories of base maps: planimetric, topographic, and orthophoto.

A planimetric map shows roads, structures, political boundaries, and waterways, etc. in two dimensions. It illustrates horizontal positioning, not the height of hills or valleys.

A photogrammetric planimetric map is a planimetric map which has been prepared from aerial photographs and has been corrected so that horizontal measurements taken from the map accurately reflect the distance on the ground within a certain tolerance.

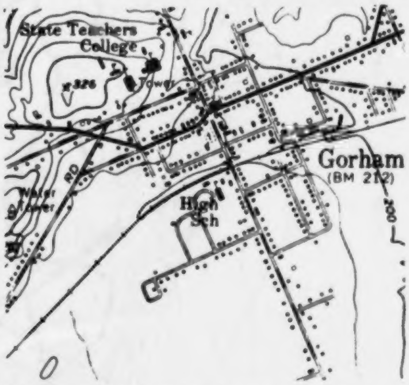
A topographic map shows the type of information illustrated on a planimetric map plus it has contour lines to show hills and valleys of the land, drainage patterns and the steepness of slopes.

A photogrammetric topographic map is a topographic map which has been prepared from aerial photographs and has been corrected so that both horizontal and vertical measurements taken from the map accurately reflect the distances and elevations on the ground within a certain tolerance.

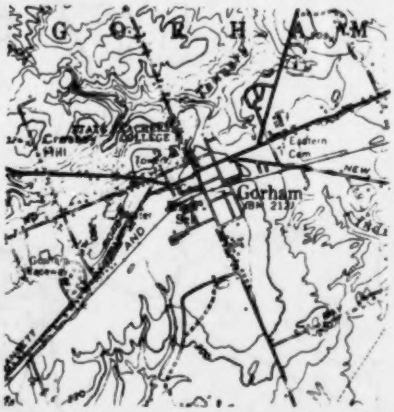
An orthophoto map is a map composed of a corrected aerial photograph on which features such as road names, place names, property boundaries, and political boundaries have been added. All the features which appear on an aerial photograph also appear on an orthophoto map.

MAP SCALE [2]

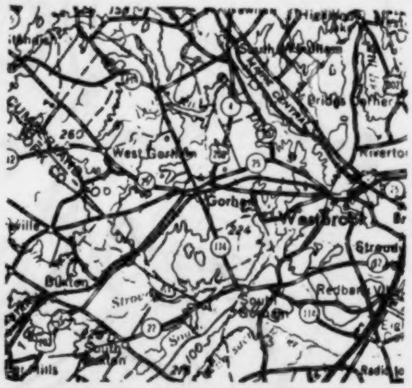
Map scale defines the relationship between the measurements of the features as shown on the map and as they exist on the Earth's surface. Scale is generally stated as a ratio or fraction —



1:24,000 scale, 1 inch = 2,000 feet. Area shown, 1 square mile.



1:62,500 scale, 1 inch = about 1 mile. Area shown, 6¾ square miles



1:250,000 scale, 1 inch = about 4 miles. Area shown, 107 square miles

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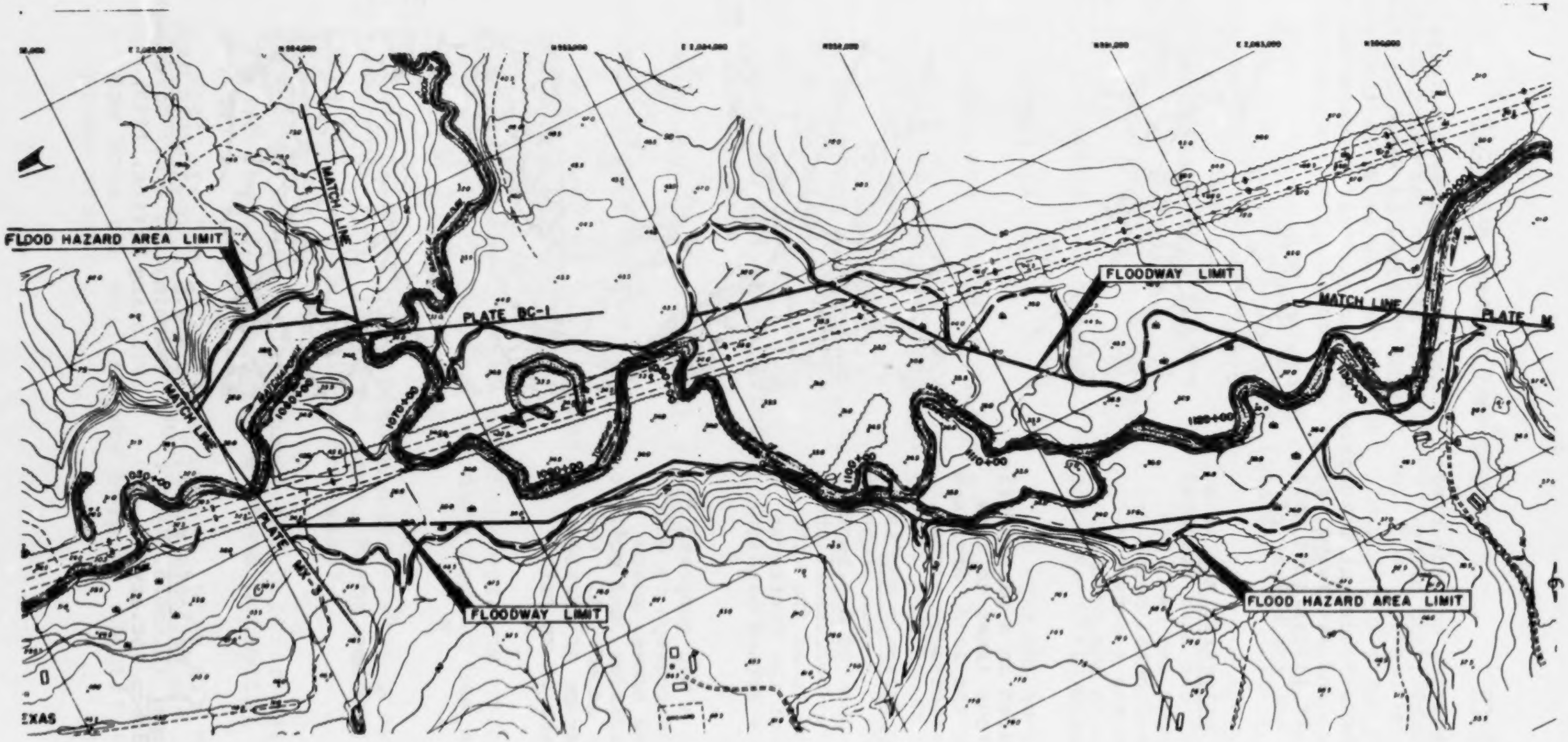
1. Barbara Maire et. al, Wetlands and Floodplains on Paper (Lincoln, Mass.: Massachusetts Audubon Society, undated)

2. U.S.G.S., Topographic Maps (Washington, D.C.: Government Printing Office, 1972)

FLOODPLAIN DELINEATION ON A PHOTOGRAMMETRIC TOPOGRAPHIC MAP


FLOOD HAZARD AREA LIMIT
MATCH LINE
PLATE BC-1
MATCH LINE
PLATE MX-3
FLOODWAY LIMIT
1030+00
1040+00
1070+00
1080+00
1100+00
1110+00
1120+00
1130+00
FLOODWAY LIMIT
MATCH LINE
PLATE M
FLOOD HAZARD AREA LIMIT
EXAS

PLAN

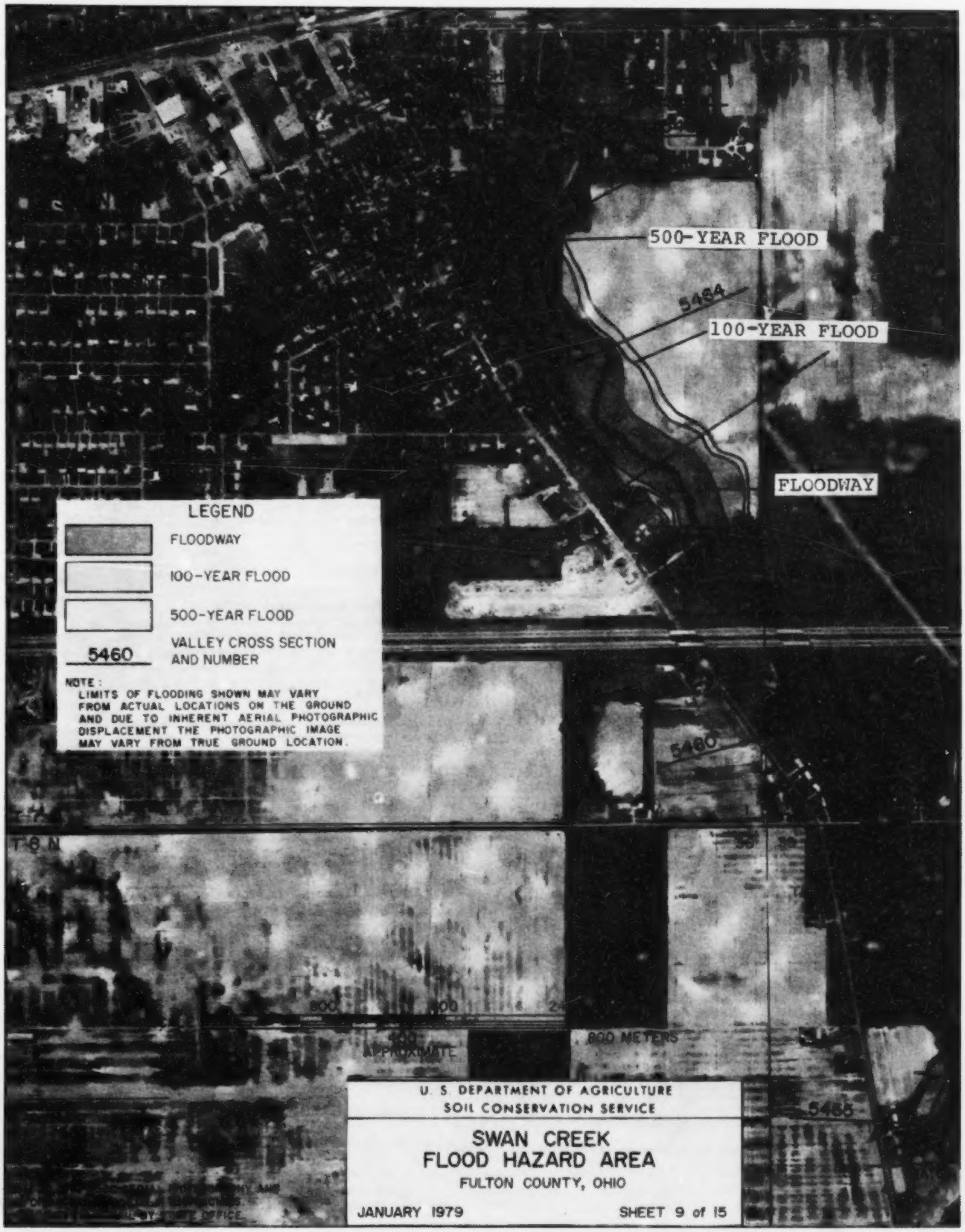
200 0 200 400 600
SCALE IN FEET

STATE OF NEW JERSEY
DEPARTMENT of CONSERVATION
&
ECONOMIC DEVELOPMENT
DIVISION of WATER POLICY and SUPPLY
DELINEATION OF FLOODWAY
AND FLOOD HAZARD AREA
MATCHAPONIX BROOK
STA.1005+00 TO STA.1136+00
MADISON TOWNSHIP, MONROE TOWNSHIP
Middlesex County, New Jersey

Anderson-Nichols & Co.
Boston, Mass.

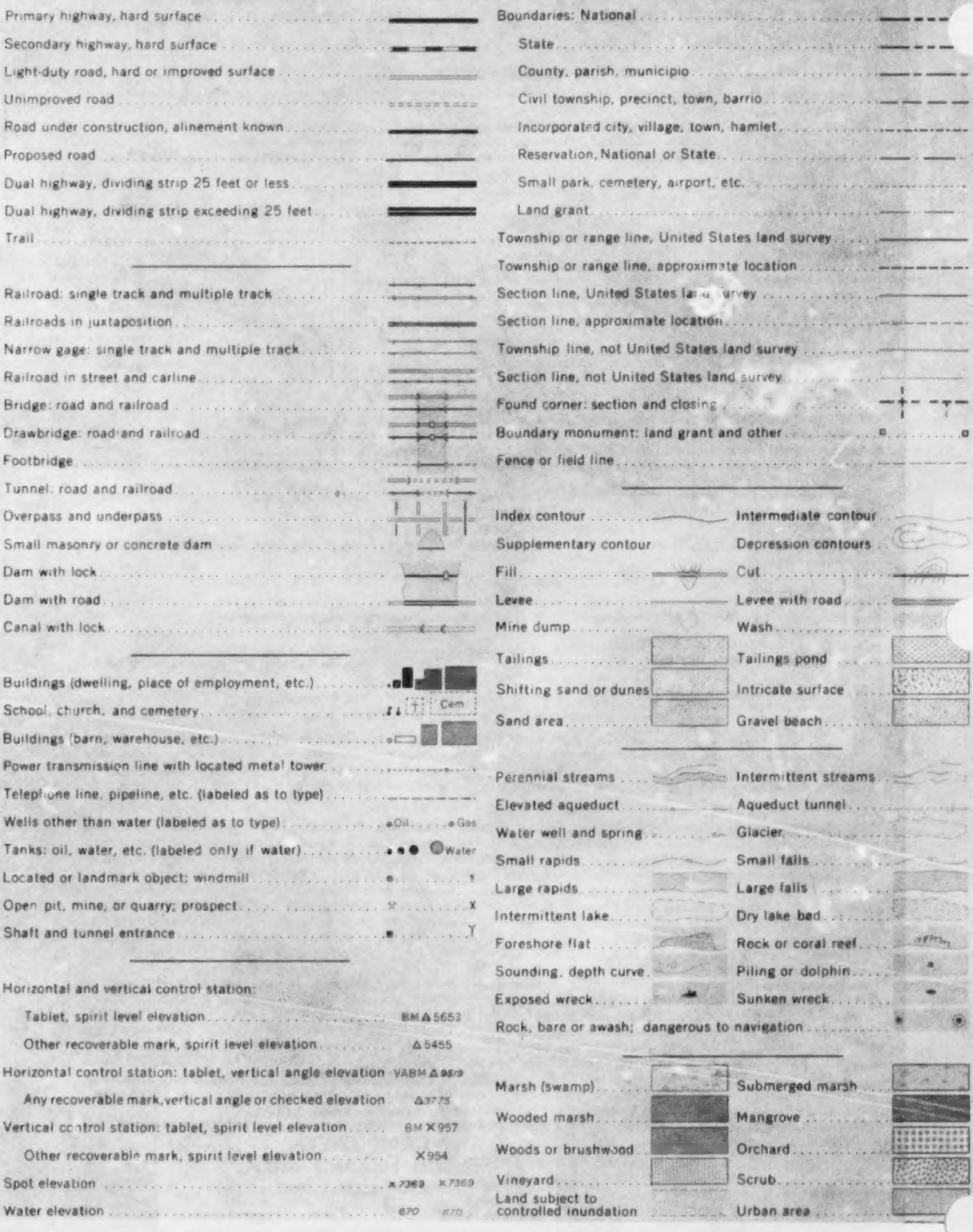
PLATE MX-4

FLOODPLAIN DELINEATION ON AN ORTHOPHOTO MAP


500-YEAR FLOOD
5464
100-YEAR FLOOD
FLOODWAY
LEGEND
FLOODWAY
100-YEAR FLOOD
500-YEAR FLOOD
5460 VALLEY CROSS SECTION AND NUMBER
NOTE: LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.
5460
T 8 N
800
400
0
400
800 METERS
APPROXIMATE
5456
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
SWAN CREEK
FLOOD HAZARD AREA
FULTON COUNTY, OHIO
JANUARY 1979
SHEET 9 of 15

TOPOGRAPHIC MAP SYMBOLS

VARIATIONS WILL BE FOUND ON OLDER MAPS



Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Road under construction, alinement known
Proposed road
Dual highway, dividing strip 25 feet or less
Dual highway, dividing strip exceeding 25 feet
Trail

Railroad: single track and multiple track
Railroads in juxtaposition
Narrow gage: single track and multiple track
Railroad in street and carline
Bridge: road and railroad
Drawbridge: road and railroad
Footbridge
Tunnel: road and railroad
Overpass and underpass
Small masonry or concrete dam
Dam with lock
Dam with road
Canal with lock

Buildings (dwelling, place of employment, etc.)
School, church, and cemetery
Buildings (barn, warehouse, etc.)
Power transmission line with located metal tower
Telephone line, pipeline, etc. (labeled as to type)
Wells other than water (labeled as to type)
Tanks: oil, water, etc. (labeled only if water)
Located or landmark object; windmill
Open pit, mine, or quarry; prospect
Shaft and tunnel entrance

Horizontal and vertical control station:
Tablet, spirit level elevation
Other recoverable mark, spirit level elevation
Horizontal control station: tablet, vertical angle elevation
Any recoverable mark, vertical angle or checked elevation
Vertical control station: tablet, spirit level elevation
Other recoverable mark, spirit level elevation
Spot elevation
Water elevation

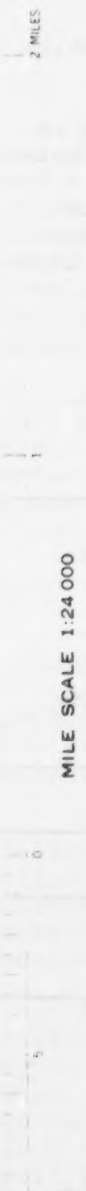
Boundaries: National
State
County, parish, municipio
Civil township, precinct, town, barrio
Incorporated city, village, town, hamlet
Reservation, National or State
Small park, cemetery, airport, etc.
Land grant
Township or range line, United States land survey
Township or range line, approximate location
Section line, United States land survey
Section line, approximate location
Township line, not United States land survey
Section line, not United States land survey
Found corner: section and closing
Boundary monument: land grant and other
Fence or field line

Index contour
Intermediate contour
Supplementary contour
Depression contours
Fill
Cut
Levee
Levee with road
Mine dump
Wash
Tailings
Tailings pond
Shifting sand or dunes
Intricate surface
Sand area
Gravel beach

Perennial streams
Intermittent streams
Elevated aqueduct
Aqueduct tunnel
Water well and spring
Glacier
Small rapids
Small falls
Large rapids
Large falls
Intermittent lake
Dry lake bed
Foreshore flat
Rock or coral reef
Sounding, depth curve
Piling or dolphin
Exposed wreck
Sunken wreck
Rock, bare or awash; dangerous to navigation

Marsh (swamp)
Submerged marsh
Wooded marsh
Mangrove
Woods or brushwood
Orchard
Vineyard
Scrub
Land subject to controlled inundation
Urban area

MILE SCALE 1:62 500



UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

TOPOGRAPHI
MAP INFORMATION AN
MARCH 1978

QUADRANGLE MAPS AND SERIES

Quadrangle maps cover four-sided areas bounded by parallels of latitude and meridians of longitude. Quadrang
minutes or degrees.

Map series are groups of maps that conform to established specifications for size, scale, content, and othe

Map scale is the relationship between distance on a map and the corresponding distance on the ground

Map scale is expressed as a numerical ratio and shown graphically by bar scales marked in feet, miles, an

NATIONAL TOPOGRAPHIC MAPS

Series	Scale	1 inch represents	1 centimeter represents	Standard quadrangle size (latitude-longitude)
7½-minute	1:24,000	2,000 feet	240 meters	7½ × 7½ min.
7½ × 15-minute	1:25,000	about 2,083 feet	250 meters	7½ × 15 min.
Puerto Rico 7½-minute	1:20,000	about 1,667 feet	200 meters	7½ × 7½ min.
15-minute	1:62,500	nearly 1 mile	625 meters	15 × 15 min.
Alaska 1:63,360	1:63,360	1 mile	nearly 634 meters	15 × 20 to 36 min.
Intermediate	1:100,000	nearly 1.6 miles	1 kilometer	30 × 60 min.
U. S. 1:250,000	1:250,000	nearly 4 miles	2.5 kilometers	1° × 2° or 3°
U. S. 1:1,000,000	1:1,000,000	nearly 16 miles	10 kilometers	4° × 6°
Antarctica 1:250,000	1:250,000	nearly 4 miles	2.5 kilometers	1° × 3° to 15°
Antarctica 1:500,000	1:500,000	nearly 8 miles	5 kilometers	2° × 7½°

CONTOUR LINES SHOW LAND SHAPES AND ELEVATION

The shape of the land, portrayed by contours, is the distinctive characteristic of topographic maps.

Contours are imaginary lines following the ground surface at a constant elevation above or below sea lev

Contour interval is the elevation difference represented by adjacent contour lines on maps.

Contour intervals depend on ground slope and map scale. Small contour intervals are used for flat areas; larger
for mountainous terrain.

Supplementary dotted contours, at less than the regular interval, are used in selected flat areas.

Index contours are heavier than others and most have elevation figures.

Relief shading, an overprint giving a three-dimensional impression, is used on selected maps.

Orthophotomaps, which depict terrain and other map features by color-enhanced photographic images,
selected areas.

COLORS DISTINGUISH KINDS OF MAP FEATURES

Black is used for manmade or cultural features, such as roads, buildings, names, and boundaries.

Blue is used for water or hydrographic features, such as lakes, rivers, canals, glaciers, and swamps.

Brown is used for relief or hypsographic features—land shapes portrayed by contour lines.

Green is used for woodland cover, with patterns to show scrub, vineyards, or orchards.

Red emphasizes important roads and is used to show public land subdivision lines, land grants, and fence

Red tint indicates urban areas, in which only landmark buildings are shown.

Purple is used to show office revision from aerial photographs. The changes are not field checked.

INDEXES SHOW PUBLISHED TOPOGRAPHIC MAPS

Indexes for each State, Puerto Rico and the Virgin Islands of the United States, Guam, American Samo
show available published maps. Index maps show quadrangle location, name, and survey date. Listed als
and sheets, with prices, map dealers, Federal distribution centers, and map reference libraries, and instru
maps. Indexes and a booklet describing topographic maps are available free on request.

HOW MAPS CAN BE OBTAINED

Mail orders for maps of areas east of the Mississippi River, including Minnesota, Puerto Rico, the Virgin Is
States, and Antarctica should be addressed to the Branch of Distribution, U. S. Geological Survey, 1200
Arlington, Virginia 22202. Maps of areas west of the Mississippi River, including Alaska, Hawaii, L
Samoa, and Guam should be ordered from the Branch of Distribution, U. S. Geological Survey, Box 25
Denver, Colorado 80225. A single order combining both eastern and western maps may be placed
Residents of Alaska may order Alaska maps or an index for Alaska from the Distribution Section, U. S.
Federal Building-Box 12, 101 Twelfth Avenue, Fairbanks, Alaska 99701. Order by map name, State,
order amounting to $300 or more at the list price, a 30-percent discount is allowed. No other disc
Prepayment is required and must accompany each order. Payment may be made by money order or ch
U. S. Geological Survey. Your ZIP code is required.

Sales counters are maintained in the following U. S. Geological Survey offices, where maps of the area m
person: 1200 South Eads Street, Arlington, Va.; Room 1028, General Services Administration Buildin
NW, Washington, D. C.; 1400 Independence Road, Rolla, Mo.; 345 Middlefield Road, Menlo Park,
Federal Building, 300 North Los Angeles Street, Los Angeles, Calif.; Room 504, Custom House, 555
Francisco, Calif.; Building 41, Federal Center, Denver, Colo.; Room 1012, Federal Building, 1961 S
Colo.; Room 1C45, Federal Building, 1100 Commerce Street, Dallas, Texas; Room 8105, Federal B
State Street, Salt Lake City, Utah; Room 1C402, National Center, 12201 Sunrise Valley Drive, Rest
U. S. Court House, West 920 Riverside Avenue, Spokane, Wash.; Room 108, Skyline Building, 5
Anchorage, Alaska; and Federal Building, 101 Twelfth Avenue, Fairbanks, Alaska.

Commercial dealers sell U. S. Geological Survey maps at their own prices. Names and addresses of deal
State index.

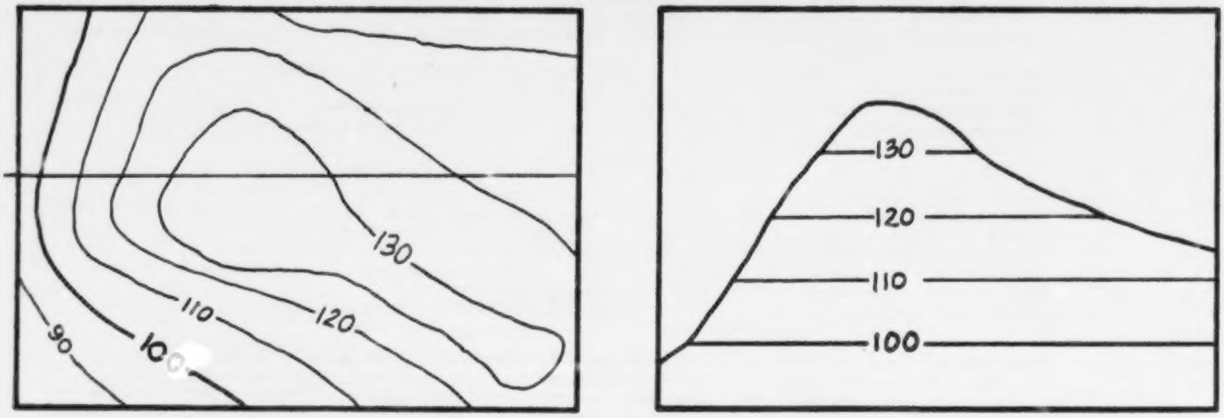
INTERIOR—GEOLOGICAL SURV

CONTOUR LINES

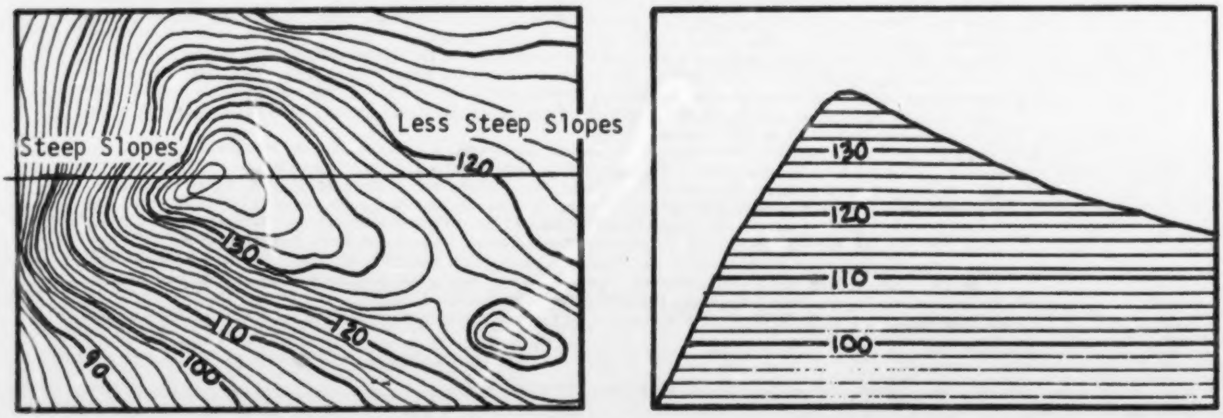
A contour line is an imaginery line drawn on the ground which connects points of the same altitude or elevation.

The contour interval is the vertical distance (difference in elevation) separating contour lines. While contour intervals between maps may vary, on any single map the interval is constant. The horizontal spacing of the contour lines, therefore, varies with land slope. In general, the closer the contour lines the steeper the slope. Wide spacing between lines indicates more gentle slopes. When contour lines cross streams the contour is bent into a V, the V points in the upstream direction.

COMPARISON OF CONTOUR INTERVALS [1]


130
110
120
90
100
130
120
110
100

10' CONTOUR INTERVAL.


Less Steep Slopes
Steep Slopes
120
130
110
120
90
100
130
120
110
100

2' CONTOUR INTERVAL.

---

[1] Barbara Maire et. al, Wetlands and Floodplains on Paper (Lincoln, Mass.: Massachusetts Audubon Society, undated)

THE SOIL SURVEY

Man is dependent on soils. Soils provide the habitat for plants and crops; the foundations for buildings and roads; and receptacles for domestic, municipal, industrial and animal wastes. Soil management should be a fundamental planning concern and the soil survey is an essential planning tool. The soil survey, conducted by the Soil Conservation Service, provides the basic information needed for planning including: a map depicting different soil types and a description of the properties and limitations of these soils.

Of particular interest for land use planning are the soil's "engineering properties" and "engineering interpretations." These interpretations indicate the suitability of areas for different uses. For example, the suitability of areas for homebuilding sites involves an evaluation of the flood hazards, height of the water table, slope of the land, shrink-swell potential of the soil and depth of the soil to hard rock.[1]

The suitability of a site for septic tanks is rated according to the permeability of the soil (the ease with which water penetrates the soil), the land slope, filtering capacity, level of the water table, and potential for flooding.[2] Additional suitability interpretations include use for highways, ponds or reservoirs, and recreation.

Soils maps, themselves, are very useful for floodplain delineation. Soils which are deposited by running water (called alluvial soils) or soils which are frequently covered by water differ in texture, color, or structure from those which develop under drier conditions. Such soils will, therefore, have classifications different from non-flood-prone soils.

Attached is a chart depicting the soil suitability interpretations and a brief description of the major soil types found on the map sheet to be used in this exercise. Those soils which have developed under wet conditions or were deposited by running water can be identified from these descriptions. By drawing boundaries around these soil types it is possible to make a rough delineation of the flood hazard area.

---

1. U.S. Department of Agriculture, Soil Conservation Service, Soil Survey For Wake County, North Carolina. (Washington, D.C.: GPO, 1970)

2. Ibid.

KEY

ZONING:

45	Residential
46	Commercial
47	Heavy Industrial
48	Light Industry
49	Forest Agriculture
50	Conservation/Preservation
51	Historic Building District
52	Mobile Home
53	Destination Park
54	Planned Development
71	Port/GAPC
99	Unclassified and/or Water

DEVELOPMENT.

110	Residential
120	Retail/Wholesale
130	Industrial
140	Extractive
150	Transportation
160	Institutional
190	Open and Other Urban
200	Agriculture

SOILS:

10	Leon
12	Eunola
13	Bladen
18	Cape Fear
20	Centenary
27	Rutlege
28	Echaw
34	Johnston
50	Lynn-Haven
54	Chipley
55	Witherbee
57	Grifton (Ogeechee)
59	Wahee
61	Yemassee
251	Wakulla
602	Lakeland (Wando)
500	Open Water
99	Unclassified

WETLANDS:

400	Forest	
440	Logged Area/ Brush	
500	Open Water	
510	Impoundments	
610	Forested Wetlands	
620	Unforested Wetlands	
621	Sale Marsh	
623	Brackish Water Marsh	
624	Fresh Water Marsh	
630	Abandoned Rice	
	631	Low Salt Marsh
	632	High Sale Marsh
	633	Brackish Marsh
	634	Freshwater Marsh
720	Beach	

SOILS: GEORGETOWN SOUTH, S.C.

Leon (10)
Poorly drained sandy soils with slopes less than 5%.

Eulonia (12)
Deep moderately well drained soils on the lower coastal plain. Slopes less than 2%.

Bladen (13)
Poorly drained soils occurring on broad nearly level flats of the coastal plains.

Cape Fear (18)
Nearly level, very poorly drained soils on stream terraces and low uplands of the coastal plain. Flooding of brief duration is frequent from January to May.

Centenary (20)
Sandy, moderately well drained, rapidly permeable soils of the coastal plain. Slopes are less than 2%.

Rutlege (27)
Deep, very poorly drained soils of upland flats and in depressions. Slopes are less than 2%. Flooding of brief duration is frequent.

Echaw (28)
Moderately well drained, permeable soils on level eroded ridges and flats of the lower coastal plain.

Johnston (34)
Very poorly drained soils on nearly level flood plains of the coastal plain. Flooding, sometimes of long duration, is common.

Lynn Haven (50)
Poorly drained sandy soils with slopes of less than 2%.

Witherbee (55)
Sandy, somewhat poorly drained, rapidly permeable soils on nearly level broad ridges and flats of the lower coastal plain. Slopes of less than 2%.

Grifton (57)
Poorly drained soils on the middle and lower coastal plain uplands and stream terraces. Slopes are generally less than 2%.

Wahee (59)
Poorly drained, slowly permeable, soils of the coastal plains. Slope range to 4%. Flooding, of brief duration, is common on some of these soils.

Yemassee (61)
Poorly drained, nearly level soils on the lower coastal plain. Some rare flooding.

Wakulla (251)
Nearly level to sloping, well drained soils on upland and stream terraces of the coastal plain. Slopes range from 0-10%.

Lakeland (602)
Very well drained nearly level to steep soils on coastal plain uplands. Slopes range from 0 to 30%.

SOIL SURVEY - GEORGETOWN COUNTY, SOUTH CAROLINA

SOIL SERIES AND MAP SYMBOL	DEGREE OF LIMITATION FOR -					
	SEPTIC TANK ABSORPTION FIELDS	HOMEBUILDING SITES	RECREATION			
			CAMPSITES	PICNIC AREAS	PLAYGROUNDS	TRAILS
Leon (10)	Severe: wetness, poor filter	Severe, wetness	Severe: wetness, too sandy	Severe: wetness too sandy	Severe: wetness too sandy	Severe: wetness, too sandy
Eulonia (12)	Severe: wetness	Severe - moderate: wetness	Moderate	Moderate	Moderate	Moderate
Bladen (13)	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Cape Fear (18)	Severe: wetness, floods	Severe: wetness, floods	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Centenary (20)	Severe: wetness, poor filter	Severe - moderate: wetness	Severe: too sandy	Severe: too sandy	Severe: too sandy	Severe: too sandy
Rutlege (27)	Severe: wetness, floods	Severe: wetness, Floods	Severe: wetness, floods	Severe: wetness	Severe: wetness, too sandy	Severe: wetness
Echaw (28)	Severe: wetness, poor filter	Moderate - slight	Severe: too sandy	Severe: too sandy	Severe: too sandy	Severe: too sandy
Johnston (34)	Severe: floods, ponding, poor filter	Severe: floods, ponding	Severe: floods, ponding	Severe: ponding	Severe: ponding, floods	Severe: ponding
Lynn Haven (50)	Severe: wetness, poor filter	Severe, wetness	Severe: wetness, too sandy	Severe: wetness, too sandy	Severe: wetness, too sandy	Severe: wetness, too sandy
Witherbee (55)	Severe: wetness, poor filter	Severe: wetness	Severe: wetness. too sandy	Severe: wetness too sandy	Severe: wetness, too sandy	Severe: wetness, too sandy

SOIL SURVEY - GEORGETOWN COUNTY, SOUTH CAROLINA

SOIL SERIES AND MAP SYMBOL	DEGREE OF LIMITATION FOR -					
			RECREATION			
	SEPTIC TANK ABSORPTION FIELDS	HOMEBUILDING SITES	CAMPSITES	PICNIC AREAS	PLAYGROUNDS	TRAILS
Grifton (57)	Severe: wetness,	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Wahee (59)	Severe: floods, wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Yemassee (61)	Severe: wetness	Severe: wetness, some flooding	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Wakulla (251)	Slight	Slight	Severe: too sandy	Severe: too sandy	Severe: too sandy	Severe: too sandy
Lakeland (602)	Severe: poor filter	Slight	Severe: too sandy	Severe: too sandy	Severe: too sandy	Severe: too sandy

APPENDIX B

MAPPING EXERCISE MATERIALS

(RIVERINE)

SAMPLE BRIEFING MEMORANDUM

To: Workshop Leaders "Identifying Natural Resources and Flood Hazard Data Sources For Decision-making"--"Mapping Exercise"

Thank you for agreeing to serve as a workshop leader for the Sunday, May 18, evening session (7:45-9:15 a.m.) during the Region V Riverine Flood Hazard Management Training Institute.

The workshops you will be leading represent an important element of the training program. The purpose of this session is two fold: (1) to describe the special ecological characteristics and hazard mitigation functions of riverine ecosystems, (2) to familiarize participants with several types of maps commonly available to communities and to increase participant appreciation for the use of maps as essential flood hazard mitigation planning tools.

The session will be divided into two parts. During the first hour, group discussion will focus on riverine ecosystems and the special role natural resources can play in hazard mitigation. You should begin the session by giving a brief 20-25 minute presentation usng slides or any other visuals you may find useful in your talk. You should highlight the causes of flooding in a particular geographic area and describe the special qualities of typical riverine ecosystems such as river corridors, wetlands and transition zones. You will also want to point out what role these natural resources can play in reducing flood hazards. Following your presentation, you should answer questions from the audience.

At approximately 10 minutes before the first hour is up you should close discussion and give participants a brief break but encourage them to stay in the room. During this break you should distribute the mapping materials on the tables in preparation for the next portion of the session.

During the second part of this session you will be leading the group in mapping exercise on land use suitability. You should begin this portion of the session with a very brief (5-10 minute) presentation on the principles of land use suitability analysis. A land suitability analysis is a process of data gathering, interpretation, and representation which results in a land clasification scheme reflecting the natural suitability or carry capacity of the land. The analysis is a stepped process involving: the identification of environmental considerations or elements (this identification could be based on the material discussed in a preceeding session on the nature of flooding and the role of ecological resources in flood hazard mitigation); the interpretation of this data (on a resource by resource basis) through the application of management principals to determine its limitations (a typical soils interpretation tables is an example of this); the mapping of each resource variable (on a common scale); and finally the overlaying of variables to form an environmental composite or suitability map.

Several important questions and considerations about community mapping should be raised as part of your initial group presentation. These questions include:

1. What is a suitable community base map? (scale and availability)

2. What environmental factors or values are of particular importance to the community (i.e., septic tank siting, hazard mitigation, etc.) What is the purpose or goal for the mapping project?

3. What technique, medium, or materials are most appropriate to use in representing this information? How much will it cost?

For the remaining 50 minutes of the session participants will break into small groups (10-15 people) to "work" with a set of maps and map overlays. Your role should be to guide the discussion and to see that important features on the maps are discussed.

Remember that your group will consist of local officials, citizen activists and business leaders. Since the group's familiarity with maps will vary greatly, it would be most appropriate to keep the discussion basic.

Each group will be provided with two sets of maps. Each set will consist of: a U.S.G.S. quad sheet; 3 clear mylar overlays (flood hazards, soils, and land use); and a set of aerial photos, from two different years, showing development in the region. Acetate and markers will be provided to allow participants to color or highlight features or soil types on the maps. (For

example, you might want to consider having partici
and color soil types based on their suitability fc
During the session we would like you to move the
a suitability analysis, using these maps.

Enclosed you will find blue line copies of these
key to the maps, and interpretation of soil types
you will find a list of "features of interest" an
you may wish to address during the session. At t
participants will receive a handout which introdu
types of maps; map scale; topographic lines; and
map symbols; and general detailed description of
a more detailed interpretation of soil types appe

We would like to meet with you and the other work
at about 7:15 p.m. on Sunday to once more review
of the session and to answer quetions. Attached
other workshop leaders including their addresses
You might want to contact other workshop leaders
institute to exchange ideas. We will let you kno
and location of that meeting at registration.

Once again, thank you for agreeing to serve as a
in this most important training institute. We lc
meeting you on May 18.

WAKE FOREST, N.C.

The land within the Wake Forest Quandrangle is drained by a network of small streams and the larger Neuse River. Most of the smaller streams are characterized by V-shaped valleys with narrow floodplains. The Neuse River has a more U-shaped valley and a wider floodplain than the smaller streams. All the streams in the area have relatively steep gradients and steep valley walls. Even the Neuse River has some rapids at the town of Falls where the river drops 10 feet over a 1000 foot distance. Due to the significant relief, including slopes up to 45%, the natural surface water drainage is rapid and the runoff potential is high. Natural water retention areas, such as wetlands, are uncommon although numerous manmade (farm) ponds now serve as runoff retention areas.

Much of the land is currently forested by second growth species such as loblolly and shortleaf pine, althogh some areas remain in farming. Urban development is beginning to occur within the Quad, particularly around the City of Raleigh. For the large part, to date, the floodplain of the Neuse River has been left undeveloped, although some encroachment is currently occurring. Some clearing of the floodplain forest has occurred around Falls and a new pumping station has been built in the floodplain where U.S. Highway 64 crosses the river. All along the river considerable fill has been used to elevate roadbeds to allow for bridge construction. Constriction of flood flows is a possible result of this type of filling.

WAKE FOREST, N.C.

Features of Interest:

- Steep slopes
- Oxbow with wetland
- falls
- reservoirs
- intermittent streams
- location and design of subdivisions with respect to topography.

Questions of Interest:

- What type of river valley is this (U-, V-, or broad valley? What does this imply about the vegetation on and width of the floodplain?
- What are the major soil types? What are the natural limitations of these soils?
- How does the soil survey help in identifying flood-prone areas?
- What limitations are imposed by steep slopes? (Discuss in association with soils)
- What is an intermittent stream? How is it depicted on a topo map?
- Using contour lines, how can you determine the direction of stream flow? The steepness of the gradient?
- Where are "stream" valleys (on the map) which are not distinguished because of their small size?

BASE MAPS [1]

There are three categories of base maps: planimetric, topographic, and orthophoto.

A planimetric map shows roads, structures, political boundaries, and waterways, etc. in two dimensions. It illustrates horizontal positioning, not the height of hills or valleys.

A photogrammetric planimetric map is a planimetric map which has been prepared from aerial photographs and has been corrected so that horizontal measurements taken from the map accurately reflect the distance on the ground within a certain tolerance.

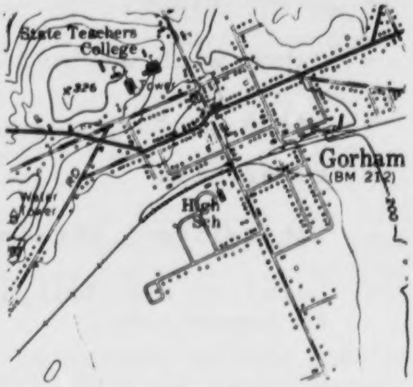
A topographic map shows the type of information illustrated on a planimetric map plus it has contour lines to show hills and valleys of the land, drainage patterns and the steepness of slopes.

A photogrammetric topographic map is a topographic map which has been prepared from aerial photographs and has been corrected so that both horizontal and vertical measurements taken from the map accurately reflect the distances and elevations on the ground within a certain tolerance.

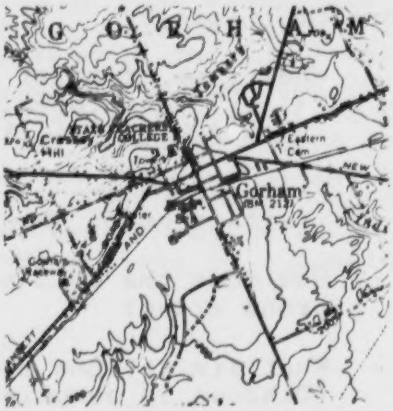
An orthophoto map is a map composed of a corrected aerial photograph on which features such as road names, place names, property boundaries, and political boundaries have been added. All the features which appear on an aerial photograph also appear on an orthophoto map.

MAP SCALE [2]

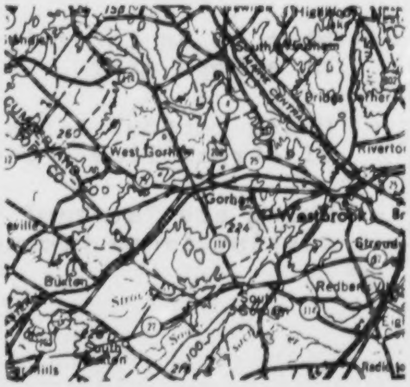
Map scale defines the relationship between the measurements of the features as shown on the map and as they exist on the Earth's surface. Scale is generally stated as a ratio or fraction —



1:24,000 scale, 1 inch = 2,000 feet. Area shown, 1 square mile



1:62,500 scale, 1 inch = about 1 mile. Area shown, 6¾ square miles



1:250,000 scale, 1 inch = about 4 miles. Area shown, 107 square miles

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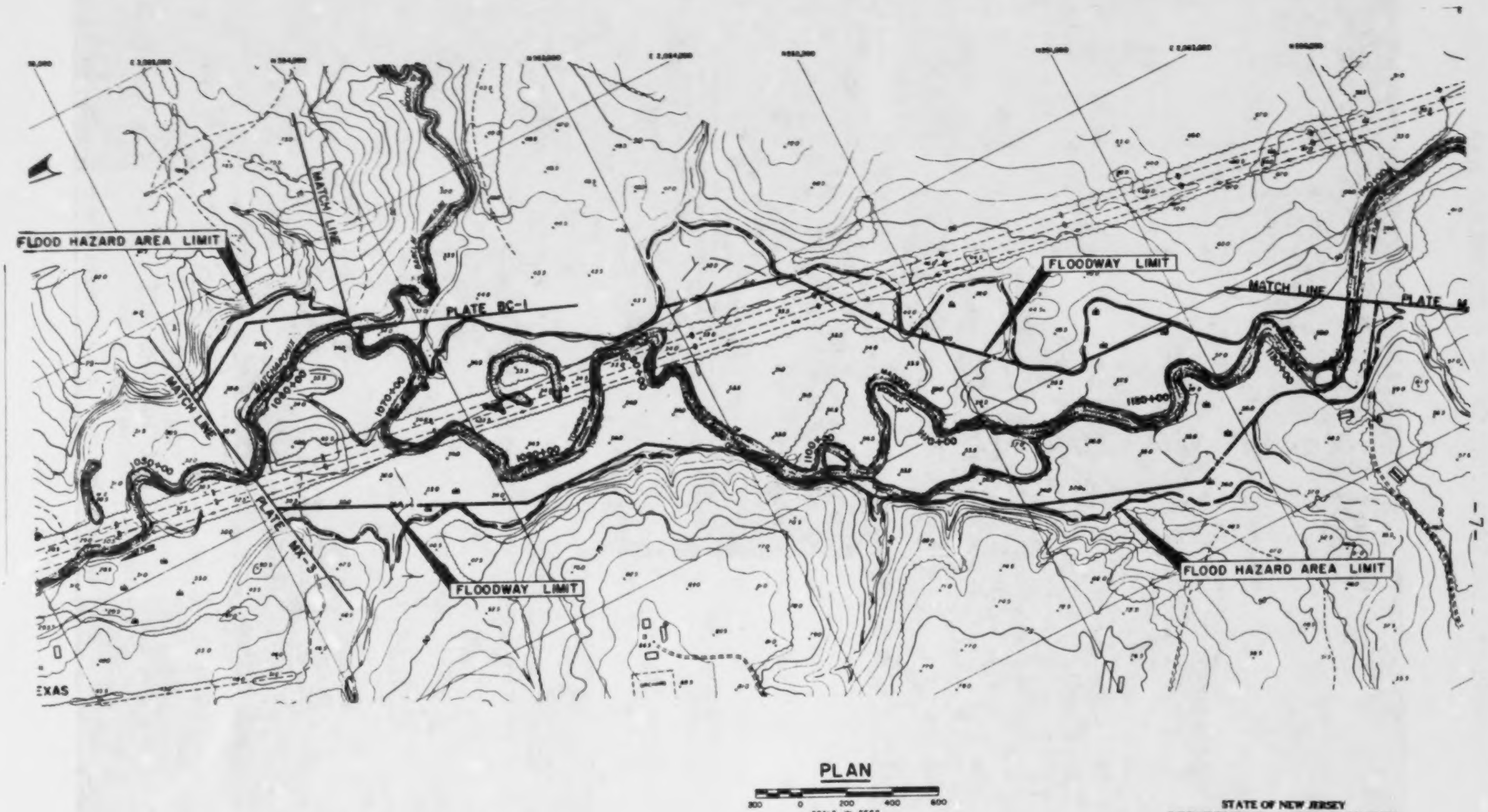
1. Barbara Maire et. al, Wetlands and Floodplains on Paper (Lincoln, Mass.: Massachusetts Audubon Society, undated)

2. U.S.G.S., Topographic Maps (Washington, D.C.: Government Printing Office, 1972)

FLOODPLAIN DELINEATION ON A PHOTOGRAMMETRIC TOPOGRAPHIC MAP

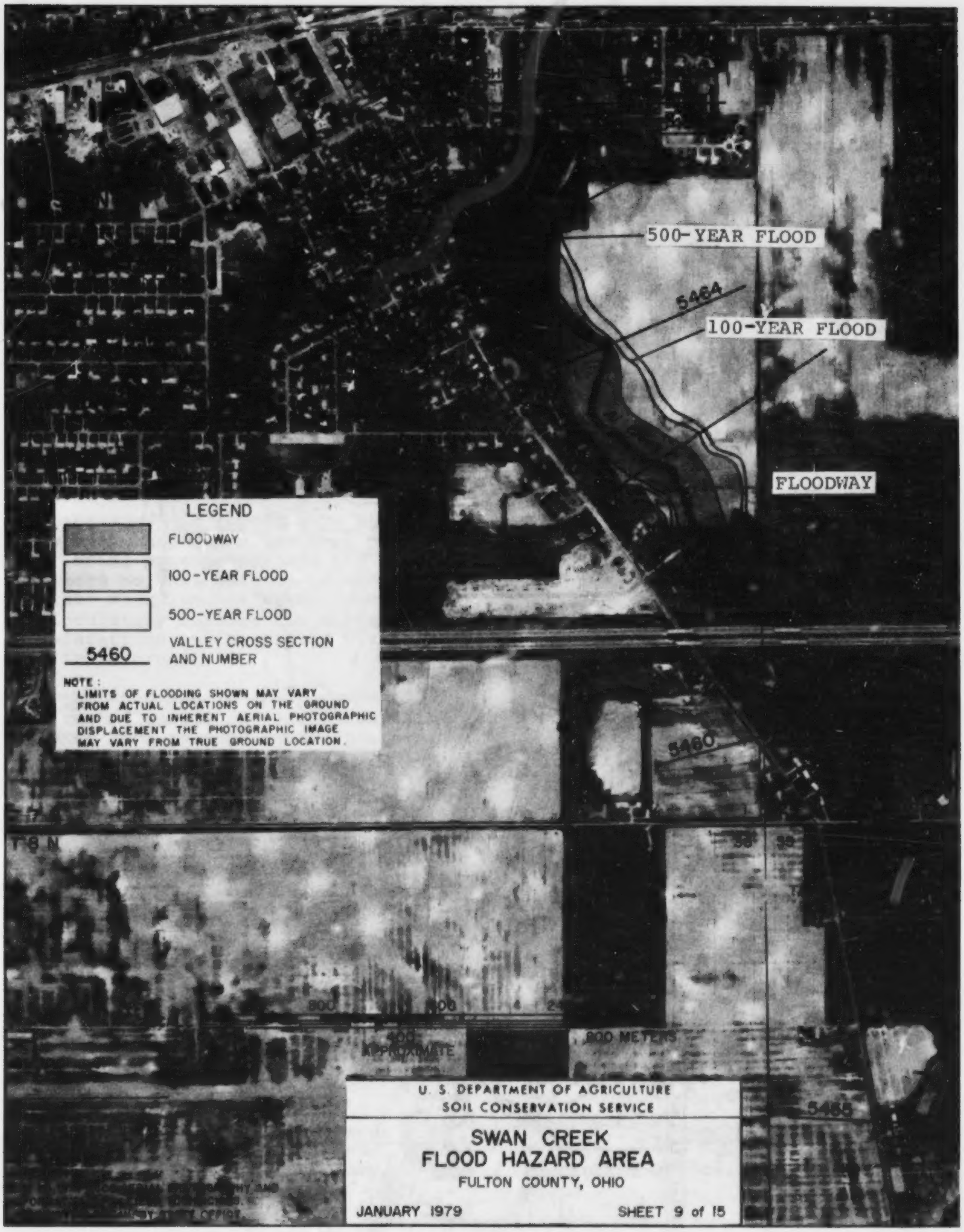

FLOOD HAZARD AREA LIMIT
MATCH LINE
PLATE BC-1
FLOODWAY LIMIT
MATCH LINE
PLATE M
MATCH LINE
PLATE MX-3
FLOODWAY LIMIT
FLOOD HAZARD AREA LIMIT
MATCHAPONIX
1050+00
1060+00
1070+00
1080+00
1100+00
1110+00
EXAS
PLAN
300
0
200
400
600
SCALE IN FEET

STATE OF NEW JERSEY
DEPARTMENT of CONSERVATION
&
ECONOMIC DEVELOPMENT
DIVISION of WATER POLICY and SUPPLY
DELINEATION OF FLOODWAY
AND FLOOD HAZARD AREA
MATCHAPONIX BROOK
STA.1050+00 TO STA.1130+00
MADISON TOWNSHIP, MONROE TOWNSHIP
Middlesex County, New Jersey

Anderson-Nichols & Co.
Boston, Mass.

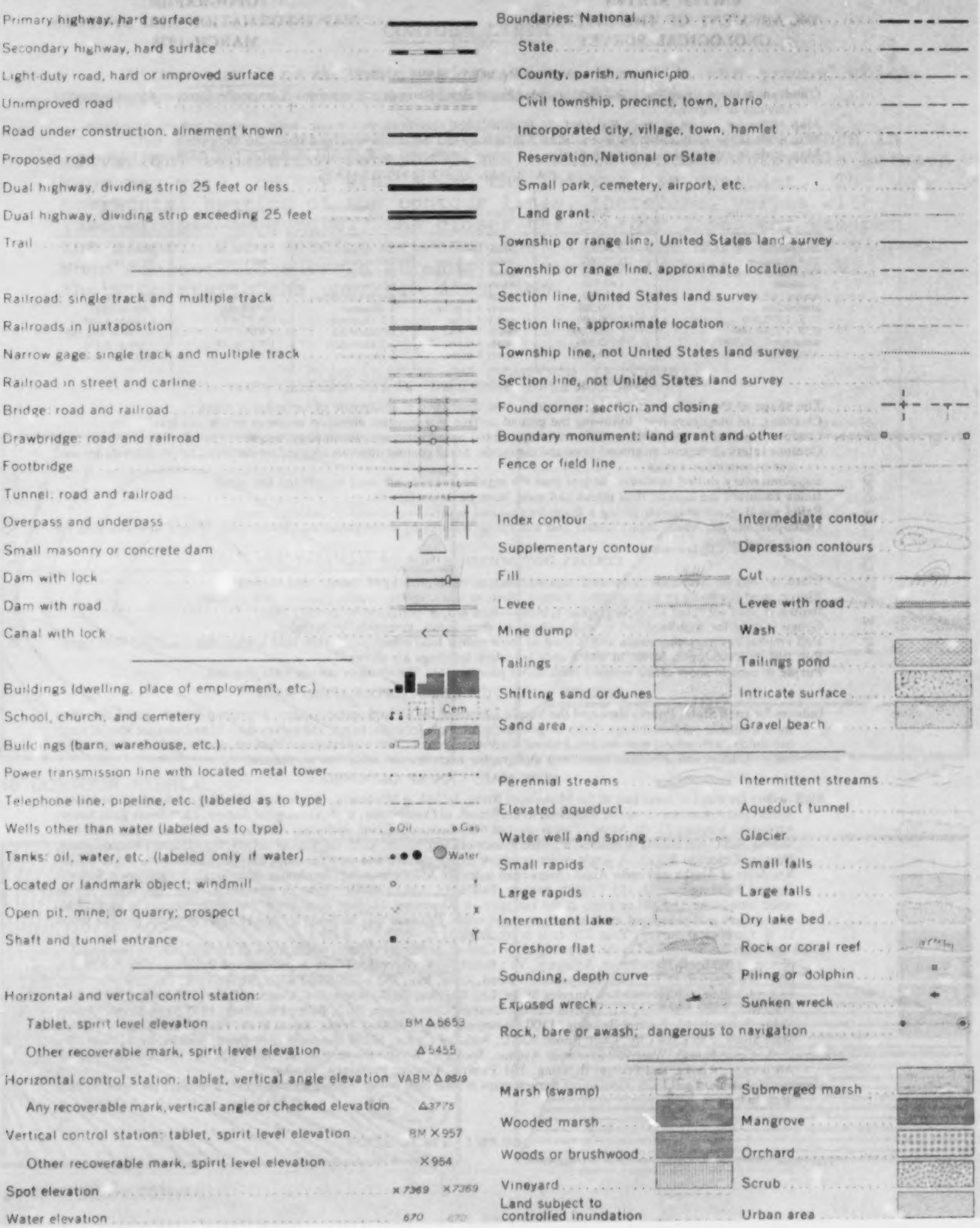
PLATE MX-4

FLOODPLAIN DELINEATION ON AN ORTHOPHOTO MAP


500-YEAR FLOOD
5464
100-YEAR FLOOD
FLOODWAY
LEGEND
FLOODWAY
100-YEAR FLOOD
500-YEAR FLOOD
5460 VALLEY CROSS SECTION AND NUMBER
NOTE: LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.
5460
T 8 N
800
400
800 METERS
APPROXIMATE
5456
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
SWAN CREEK
FLOOD HAZARD AREA
FULTON COUNTY, OHIO
JANUARY 1979
SHEET 9 of 15

TOPOGRAPHIC MAP SYMBOLS

VARIATIONS WILL BE FOUND ON OLDER MAPS



Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Road under construction, alinement known
Proposed road
Dual highway, dividing strip 25 feet or less
Dual highway, dividing strip exceeding 25 feet
Trail

Railroad: single track and multiple track
Railroads in juxtaposition
Narrow gage: single track and multiple track
Railroad in street and carline
Bridge: road and railroad
Drawbridge: road and railroad
Footbridge
Tunnel: road and railroad
Overpass and underpass
Small masonry or concrete dam
Dam with lock
Dam with road
Canal with lock

Buildings (dwelling, place of employment, etc.)
School, church, and cemetery — Cem
Buildings (barn, warehouse, etc.)
Power transmission line with located metal tower
Telephone line, pipeline, etc. (labeled as to type)
Wells other than water (labeled as to type) — Oil Gas
Tanks: oil, water, etc. (labeled only if water) — Water
Located or landmark object; windmill
Open pit, mine, or quarry; prospect
Shaft and tunnel entrance

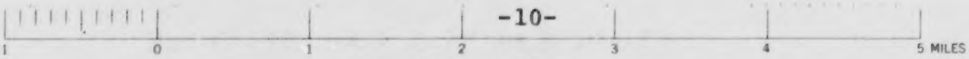
Horizontal and vertical control station:
Tablet, spirit level elevation — BM Δ 5653
Other recoverable mark, spirit level elevation — Δ 5455
Horizontal control station: tablet, vertical angle elevation — VABM Δ 9519
Any recoverable mark, vertical angle or checked elevation — Δ 3775
Vertical control station: tablet, spirit level elevation — BM × 957
Other recoverable mark, spirit level elevation — × 954
Spot elevation — × 7369 × 7369
Water elevation — 670 670

Boundaries: National
State
County, parish, municipio
Civil township, precinct, town, barrio
Incorporated city, village, town, hamlet
Reservation, National or State
Small park, cemetery, airport, etc.
Land grant
Township or range line, United States land survey
Township or range line, approximate location
Section line, United States land survey
Section line, approximate location
Township line, not United States land survey
Section line, not United States land survey
Found corner: section and closing
Boundary monument: land grant and other
Fence or field line

Index contour
Intermediate contour
Supplementary contour
Depression contours
Fill
Cut
Levee
Levee with road
Mine dump
Wash
Tailings
Tailings pond
Shifting sand or dunes
Intricate surface
Sand area
Gravel beach

Perennial streams
Intermittent streams
Elevated aqueduct
Aqueduct tunnel
Water well and spring
Glacier
Small rapids
Small falls
Large rapids
Large falls
Intermittent lake
Dry lake bed
Foreshore flat
Rock or coral reef
Sounding, depth curve
Piling or dolphin
Exposed wreck
Sunken wreck
Rock, bare or awash; dangerous to navigation

Marsh (swamp)
Submerged marsh
Wooded marsh
Mangrove
Woods or brushwood
Orchard
Vineyard
Scrub
Land subject to controlled inundation
Urban area



MILE SCALE 1:62 500

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

TOPOGRAPHIC
MAP INFORMATION AND SYMBOLS
MARCH 1978

2 MILES
1
0
5
1

MILE SCALE 1:24 000

1000
0
5000
10000
15000 FEET

FOOT SCALE 1:24 000

QUADRANGLE MAPS AND SERIES

Quadrangle maps cover four-sided areas bounded by parallels of latitude and meridians of longitude. Quadrangle size is given in minutes or degrees.

Map series are groups of maps that conform to established specifications for size, scale, content, and other elements.

Map scale is the relationship between distance on a map and the corresponding distance on the ground

Map scale is expressed as a numerical ratio and shown graphically by bar scales marked in feet, miles, and kilometers.

NATIONAL TOPOGRAPHIC MAPS

Series	Scale	1 inch represents	1 centimeter represents	Standard quadrangle size (latitude-longitude)	Quadrangle area (square miles)
7½-minute	1:24,000	2,000 feet	240 meters	7½×7½ min.	49 to 70
7½×15-minute	1:25,000	about 2,083 feet	250 meters	7½×15 min.	98 to 140
Puerto Rico 7½-minute	1:20,000	about 1,667 feet	200 meters	7½×7½ min.	71
15-minute	1:62,500	nearly 1 mile	625 meters	15×15 min.	197 to 282
Alaska 1:63,360	1:63,360	1 mile	nearly 634 meters	15×20 to 36 min.	207 to 281
Intermediate	1:100,000	nearly 1.6 miles	1 kilometer	30×60 min.	1568 to 2240
U. S. 1:250,000	1:250,000	nearly 4 miles	2.5 kilometers	1°×2° or 3°	4,580 to 8,669
U. S. 1:1,000,000	1:1,000,000	nearly 16 miles	10 kilometers	4°×6°	73,734 to 102,759
Antarctica 1:250,000	1:250,000	nearly 4 miles	2.5 kilometers	1°×3° to 15°	4,089 to 8,336
Antarctica 1:500,000	1:500,000	nearly 8 miles	5 kilometers	2°×7½°	28,174 to 30,462

CONTOUR LINES SHOW LAND SHAPES AND ELEVATION

The shape of the land, portrayed by contours, is the distinctive characteristic of topographic maps.

Contours are imaginary lines following the ground surface at a constant elevation above or below sea level.

Contour interval is the elevation difference represented by adjacent contour lines on maps.

Contour intervals depend on ground slope and map scale. Small contour intervals are used for flat areas; larger intervals are used for mountainous terrain.

Supplementary dotted contours, at less than the regular interval, are used in selected flat areas.

Index contours are heavier than others and most have elevation figures.

Relief shading, an overprint giving a three-dimensional impression, is used on selected maps.

Orthophotomaps, which depict terrain and other map features by color-enhanced photographic images, are available for selected areas.

COLORS DISTINGUISH KINDS OF MAP FEATURES

Black is used for manmade or cultural features, such as roads, buildings, names, and boundaries.

Blue is used for water or hydrographic features, such as lakes, rivers, canals, glaciers, and swamps.

Brown is used for relief or hypsographic features—land shapes portrayed by contour lines.

Green is used for woodland cover, with patterns to show scrub, vineyards, or orchards.

Red emphasizes important roads and is used to show public land subdivision lines, land grants, and fence and field lines.

Red tint indicates urban areas, in which only landmark buildings are shown.

Purple is used to show office revision from aerial photographs. The changes are not field checked.

INDEXES SHOW PUBLISHED TOPOGRAPHIC MAPS

Indexes for each State, Puerto Rico and the Virgin Islands of the United States, Guam, American Samoa, and Antarctica show available published maps. Index maps show quadrangle location, name, and survey date. Listed also are special maps and sheets, with prices, map dealers, Federal distribution centers, and map reference libraries, and instructions for ordering maps. Indexes and a booklet describing topographic maps are available free on request.

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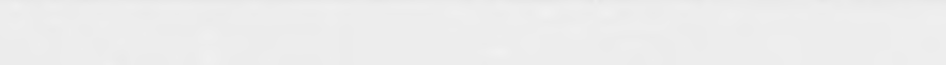
INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1978

FOOT SCALE 1:62 500

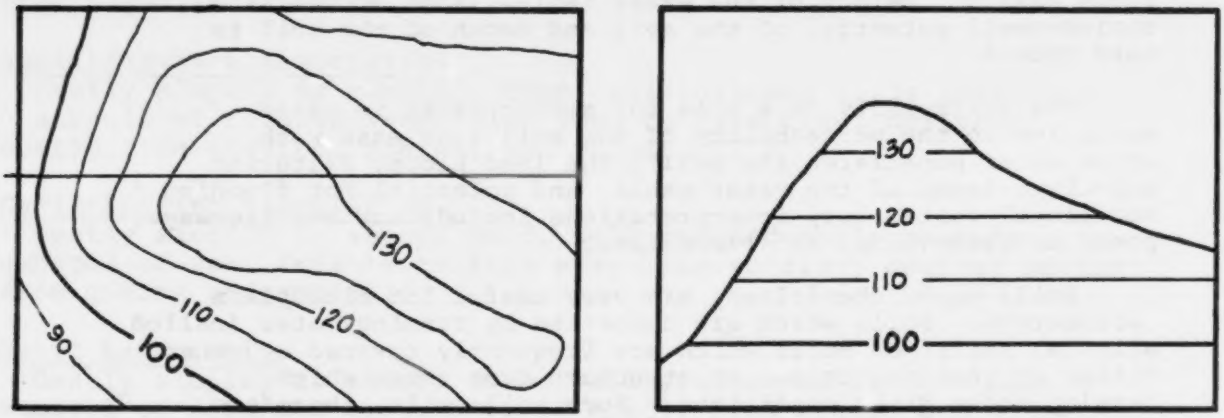


CONTOUR LINES

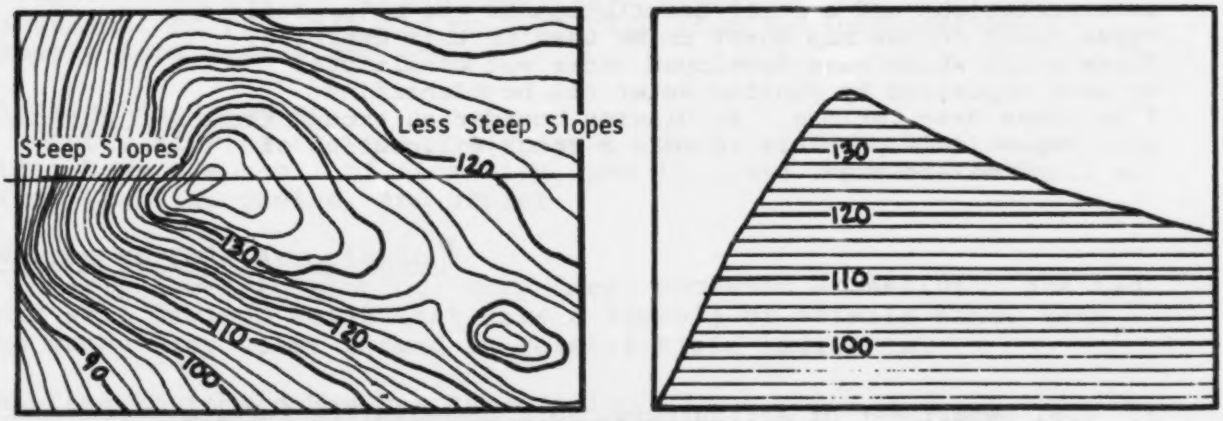
A contour line is an imaginery line drawn on the ground which connects points of the same altitude or elevation.

The contour interval is the vertical distance (difference in elevation) separating contour lines. While contour intervals between maps may vary, on any single map the interval is constant. The horizontal spacing of the contour lines, therefore, varies with land slope. In general, the closer the contour lines the steeper the slope. Wide spacing between lines indicates more gentle slopes. When contour lines cross streams the contour is bent into a V, the V points in the upstream direction.

COMPARISON OF CONTOUR INTERVALS [1]


130
120
110
100
90
130
120
110
100

10' CONTOUR INTERVAL.


Less Steep Slopes
Steep Slopes
120
130
110
120
90
100
130
120
110
100

2' CONTOUR INTERVAL.

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[1] Barbara Maire et. al, Wetlands and Floodplains on Paper (Lincoln, Mass.: Massachusetts Audubon Society, undated)

THE SOIL SURVEY

Man is dependent on soils. Soils provide the habitat for plants and crops; the foundations for buildings and roads; and receptacles for domestic, municipal, industrial and animal wastes. Soil management should be a fundamental planning concern and the soil survey is an essential planning tool. The soil survey, conducted by the Soil Conservation Service, provides the basic information needed for planning including: a map depicting different soil types and a description of the properties and limitations of these soils.

Of particular interest for land use planning are the soil's "engineering properties" and "engineering interpretations." These interpretations indicate the suitability of areas for different uses. For example, the suitability of areas for homebuilding sites involves an evaluation of the flood hazards, height of the water table, slope of the land, shrink-swell potential of the soil and depth of the soil to hard rock.[1]

The suitability of a site for septic tanks is rated according to the permeability of the soil (the ease with which water penetrates the soil), the land slope, filtering capacity, level of the water table, and potential for flooding.[2] Additional suitability interpretations include use for highways, ponds or reservoirs, and recreation.

Soils maps, themselves, are very useful for floodplain delineation. Soils which are deposited by running water (called alluvial soils) or soils which are frequently covered by water differ in texture, color, or structure from those which develop under drier conditions. Such soils will, therefore, have classifications different from non-flood-prone soils.

Attached is a chart depicting the soil suitability interpretations and a brief description of the major soil types found on the map sheet to be used in this exercise. Those soils which have developed under wet conditions or were deposited by running water can be identified from these descriptions. By drawing boundaries around these soil types it is possible to make a rough delineation of the flood hazard area.

1. U.S. Department of Agriculture, Soil Conservation Service, Soil Survey For Wake County, North Carolina. (Washington, D.C.: GPO, 1970)

2. Ibid.

SOIL ASSOCIATION

Creedmore-White Store Association

Gently sloping to hilly, deep and moderately deep, moderately well drained soild that have a very firm clayey subsoil; derived from sandstone, shale, and mudstone.

Mayodan-Granville-Creedmoor Association

Gently sloping to moderately steep, deep or moderately deep, well drained and moderately well drained soils that have a subsoil of friable sandy clay loam to very firm clay; derived from sandstone, shale, and mudstone.

Herndon-Georgeville Association

Gently sloping to moderately steep, deep, well-drained soils that have a subsoil of friable silty clay loam to clay; derived from phyllite (Carolina slates).

Appling-Durham Association

Gently sloping to sloping, deep, well-drained soils that have a subsoil of friable sandy clay loam to firm clay; derived mostly from granite, gneiss, and schist.

Cecil-Appling Association

Gently sloping to steep, deep, well-drained soils that have a subsoil of red, friable to firm clay loam to clay; derived mostly from gneiss and schist.

Cecil Association

Gently sloping to steep, deep, well-drained soils that have a subsoil of firm red clay; derived mostly from gneiss and schist.

Cecil-Madison Association

Gently sloping to steep, deep, well-drained soils that have a subsoil of red, friable to firm clay loam to clay; derived mostly from gneiss and schist.

Appling Association

Gently sloping to moderately steep, deep, well-drained soils that have a subsoil of firm clay loam to clay; derived mostly from granite, gneiss, and schist.

Wagram-Norfolk Association

Nearly level to sloping, very deep, somewhat excessively drained and well drained soils that have a subsoil of friable sandy loam to sandy clay loam; formed in Coastal Plain sediments.

Appling-Louisburg-Wedowee Association

Gently sloping to steep, deep and moderately deep, well drained and somewhat excessively drained soild that have a subsoil of very friable coarse sandy loam to firm clay; derived mostly from granite, gneiss, and schist.

KEY

Map symbol	Mapping unit
AfA	Altavista fine sandy loam, 0 to 4 percent slopes-
AgB	Appling gravelly sandy loam, 2 to 6 percent slopes
AgB2	Appling gravelly sandy loam, 2 to 6 percent slopes, eroded
AgC	Appling gravelly sandy loam, 6 to 10 percent slopes
AgC2	Appling gravelly sandy loam, 6 to 10 percent slopes, eroded
ApB	Appling sandy loam, 2 to 6 percent slopes
ApB2	Appling sandy loam, 2 to 6 percent slopes, eroded
ApC	Appling sandy loam, 6 to 10 percent slopes
ApC2	Appling sandy loam, 6 to 10 percent slopes, eroded
ApD	Appling sandy loam, 10 to 15 percent slopes
AsB	Appling fine sandy loam, 2 to 6 percent slopes
AsB2	Appling fine sandy loam, 2 to 6 percent slopes, eroded
AsC	Appling fine sandy loam, 6 to 10 percent slopes
AsC2	Appling fine sandy loam, 6 to 10 percent slopes, eroded
Au	Augusta fine sandy loam
(1/)	Borrow area
Bu	Buncombe soils
CeB	Cecil sandy loam, 2 to 6 percent slopes
CeB2	Cecil sandy loam, 2 to 6 percent slopes, eroded
CeC	Cecil sandy loam, 6 to 10 percent slopes
CeC2	Cecil sandy loam, 6 to 10 percent slopes, eroded
CeD	Cecil sandy loam, 10 to 15 percent slopes
CeF	Cecil sandy loam, 15 to 45 percent slopes
CgB	Cecil gravelly sandy loam, 2 to 6 percent slopes-
CgB2	Cecil gravelly sandy loam, 2 to 6 percent slopes, eroded
CgC	Cecil gravelly sandy loam, 6 to 10 percent slopes
CgC2	Cecil gravelly sandy loam, 6 to 10 percent slopes, eroded
ClB3	Cecil clay loam, 2 to 6 percent slopes, severely eroded
ClC3	Cecil clay loam, 6 to 10 percent slopes, severely eroded
ClE3	Cecil clay loam, 10 to 20 percent slopes, severely eroded
Cm	Chewacla soils
Cn	Colfax sandy loam
Co	Congaree fine sandy loam
Cp	Congaree silt loam
CrB	Creedmoor sandy loam, 2 to 6 percent slopes
CrB2	Creedmoor sandy loam, 2 to 6 percent slopes, eroded
CrC	Creedmoor sandy loam, 6 to 10 percent slopes
CrC2	Creedmoor sandy loam, 6 to 10 percent slopes, eroded
CrE	Creedmoor sandy loam, 10 to 20 percent slopes
CtB	Creedmoor silt loam, 2 to 6 percent slopes
CtC	Creedmoor silt loam, 6 to 10 percent slopes
DuB	Durham loamy sand, 2 to 6 percent slopes
DuB2	Durham loamy sand, 2 to 6 percent slopes, eroded
DuC	Durham loamy sand, 6 to 10 percent slopes
DuC2	Durham loamy sand, 6 to 10 percent slopes, eroded
EnB	Enon fine sandy loam, 2 to 6 percent slopes
EnB2	Enon fine sandy loam, 2 to 6 percent slopes, eroded
EnC	Enon fine sandy loam, 6 to 10 percent slopes
EnC2	Enon fine sandy loam, 6 to 10 percent slopes, eroded
EnD2	Enon fine sandy loam, 10 to 15 percent slopes, eroded
FaB	Faceville sandy loam, 2 to 6 percent slopes
FaB2	Faceville sandy loam, 2 to 6 percent slopes, eroded
FaC2	Faceville sandy loam, 6 to 10 percent slopes, eroded
GeB	Georgeville silt loam, 2 to 6 percent slopes
GeB2	Georgeville silt loam, 2 to 6 percent slopes, eroded
GeC	Georgeville silt loam, 6 to 10 percent slopes
GeC2	Georgeville silt loam, 6 to 10 percent slopes, eroded
GeD2	Georgeville silt loam, 10 to 15 percent slopes, eroded
Go	Goldsboro sandy loam
GrB	Granville sandy loam, 2 to 6 percent slopes
GrB2	Granville sandy loam, 2 to 6 percent slopes, eroded
GrC	Granville sandy loam, 6 to 10 percent slopes
GrC2	Granville sandy loam, 6 to 10 percent slopes, eroded
GrD	Granville sandy loam, 10 to 15 percent slopes
Gu	Gullied land
HeB	Helena sandy loam, 2 to 6 percent slopes
HeB2	Helena sandy loam, 2 to 6 percent slopes, eroded
HeC	Helena sandy loam, 6 to 10 percent slopes
HeC2	Helena sandy loam, 6 to 10 percent slopes, eroded
HeD	Helena sandy loam, 10 to 15 percent slopes
HrB	Herndon silt loam, 2 to 6 percent slopes
HrB2	Herndon silt loam, 2 to 6 percent slopes, eroded
HrC	Herndon silt loam, 6 to 10 percent slopes
HrC2	Herndon silt loam, 6 to 10 percent slopes, eroded
HrD2	Herndon silt loam, 10 to 15 percent slopes, eroded
HrE	Herndon silt loam, 15 to 25 percent slopes
LdB2	Lloyd loam, 2 to 6 percent slopes, eroded
LdC2	Lloyd loam, 6 to 10 percent slopes, eroded
LdD2	Lloyd loam, 10 to 15 percent slopes, eroded
LoB	Louisburg loamy sand, 2 to 6 percent slopes
LoC	Louisburg loamy sand, 6 to 10 percent slopes

KEY

Map symbol	Mapping unit
LoD	Louisburg loamy sand, 10 to 15 percent slopes
LwB	Louisburg-Wedowee complex, 2 to 6 percent slopes
LwB2	Louisburg-Wedowee complex, 2 to 6 percent slopes, eroded
LwC	Louisburg-Wedowee complex, 6 to 10 percent slopes
LwC2	Louisburg-Wedowee complex, 6 to 10 percent slopes, eroded
Ly	Lynchburg sandy loam
Ma	Made land
MdB2	Madison sandy loam, 2 to 6 percent slopes, eroded
MdC2	Madison sandy loam, 6 to 10 percent slopes, eroded
MdD2	Madison sandy loam, 10 to 15 percent slopes, eroded
MdE2	Madison sandy loam, 15 to 25 percent slopes, eroded
Me	Mantachie soils
MfB	Mayodan sandy loam, 2 to 6 percent slopes
MfB2	Mayodan sandy loam, 2 to 6 percent slopes, eroded
MfC	Mayodan sandy loam, 6 to 10 percent slopes
MfC2	Mayodan sandy loam, 6 to 10 percent slopes, eroded
MfD2	Mayodan sandy loam, 10 to 15 percent slopes, eroded
MfE	Mayodan sandy loam, 15 to 25 percent slopes
MgB	Mayodan gravelly sandy loam, 2 to 6 percent slopes
MgB2	Mayodan gravelly sandy loam, 2 to 6 percent slopes, eroded
MgC	Mayodan gravelly sandy loam, 6 to 10 percent slopes
MgC2	Mayodan gravelly sandy loam, 6 to 10 percent slopes, eroded
MyB	Mayodan silt loam, thin, 2 to 6 percent slopes
MyB2	Mayodan silt loam, thin, 2 to 6 percent slopes, eroded
MyC	Mayodan silt loam, thin, 6 to 10 percent slopes
MyC2	Mayodan silt loam, thin, 6 to 10 percent slopes, eroded
MyD	Mayodan silt loam, thin, 10 to 15 percent slopes
NoA	Norfolk loamy sand, 0 to 2 percent slopes
NoB	Norfolk loamy sand, 2 to 6 percent slopes
NoB2	Norfolk loamy sand, 2 to 6 percent slopes, eroded
NoC	Norfolk loamy sand, 6 to 10 percent slopes
NoC2	Norfolk loamy sand, 6 to 10 percent slopes, eroded
OrB	Orangeburg loamy sand, 2 to 6 percent slopes
OrB2	Orangeburg loamy sand, 2 to 6 percent slopes, eroded
OrC2	Orangeburg loamy sand, 6 to 10 percent slopes, eroded
PkC	Pinkston sandy loam, 0 to 10 percent slopes
PkF	Pinkston sandy loam, 10 to 45 percent slopes
Ps	Plummer sand
Ra	Rains fine sandy loam
Ro	Roanoke fine sandy loam
Sw	Swamp
VaB	Vance sandy loam, 2 to 6 percent slopes
VaB2	Vance sandy loam, 2 to 6 percent slopes, eroded
VaC2	Vance sandy loam, 6 to 10 percent slopes, eroded
WaA	Wagram loamy sand, 0 to 2 percent slopes
WaB	Wagram loamy sand, 2 to 6 percent slopes
WaC	Wagram loamy sand, 6 to 10 percent slopes
WgA	Wagram-Troup sands, 0 to 4 percent slopes
Wh	Wahee fine sandy loam
WkC	Wake soils, 2 to 10 percent slopes
WkE	Wake soils, 10 to 25 percent slopes
WmB	Wedowee sandy loam, 2 to 6 percent slopes
WmB2	Wedowee sandy loam, 2 to 6 percent slopes, eroded
WmC	Wedowee sandy loam, 6 to 10 percent slopes
WmC2	Wedowee sandy loam, 6 to 10 percent slopes, eroded
WmD2	Wedowee sandy loam, 10 to 15 percent slopes, eroded
WmE	Wedowee sandy loam, 15 to 25 percent slopes
Wn	Wehadkee silt loam
Wo	Wehadkee and Bibb soils
WsB	White Store sandy loam, 2 to 6 percent slopes
WsB2	White Store sandy loam, 2 to 6 percent slopes, eroded
WsC	White Store sandy loam, 6 to 10 percent slopes
WsC2	White Store sandy loam, 6 to 10 percent slopes, eroded
WsE	White Store sandy loam, 10 to 20 percent slopes
WtB	White Store silt loam, 2 to 6 percent slopes
WvD3	White Store clay loam, 2 to 15 percent slopes, severely eroded
WwC	Wilkes soils, 2 to 10 percent slopes
WwE	Wilkes soils, 10 to 20 percent slopes
WwF	Wilkes soils, 20 to 45 percent slopes
WxE	Wilkes stony soils, 15 to 25 percent slopes
Wy	Worsham sandy loam

Adapted from: U.S. Department of Agriculture, Soil Conservation Survey for Wake County, North Carolina, November 1970.

SOIL SURVEY - WAKE COUNTY, NORTH CAROLINA

Soil series and map symbols	Suitability as source of—		Degree of limitation for —				
					Recreation		
	Topsoil	Road fill	Homebuilding sites	Septic tank absorption fields	Campsites	Picnic areas	Intensive play areas
Altavista (AfA)	Fair	Fair	Severe: flooding	Severe: flooding	Moderate: flooding; fair trafficability.	Moderate: fair trafficability; flooding.	Moderate: fair trafficability; flooding.
Appling:							
(AgB, AgB2)	Fair	Fair	Moderate: coarse fragments.	Moderate: medium percolation rate.	Moderate: coarse fragments.	Moderate: coarse fragments.	Moderate: coarse fragments.
(AgC, AgC2)	Fair	Fair	Moderate: coarse fragments.	Moderate: medium percolation rate.	Moderate: coarse fragments; slopes of 6 to 10 percent.	Moderate: coarse fragments.	Moderate: coarse fragments; slopes of 6 to 10 percent.
(ApB, ApB2, AsB, AsB2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Slight	Slight	Slight
(ApC, ApC2, AsC, AsC2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.	Slight	Moderate: slopes of 6 to 10 percent.
(ApD)	Fair	Fair	Moderate: slopes greater than 10 percent.	Moderate: medium percolation rate; slopes greater than 10 percent.	Severe: slopes greater than 10 percent.	Moderate: slopes greater than 10 percent.	Severe: slopes greater than 10 percent.
Bibb (Mapped only in an undifferentiated unit with Wehadkee soils). (WO)	Poor	Fair	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table; poor trafficability.	Severe: flooding; high water table; poor trafficability.	Severe: flooding; high water table; poor trafficability.
Buncombe (Bu)	Poor	Good	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding; poor trafficability.
Cecil:							
(CeB, CeB2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Slight	Slight	Slight
(CeC, CeC2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.	Slight	Moderate: slopes of 6 to 10 percent.
(CeD)	Fair	Fair	Moderate: slopes of 10 to 15 percent.	Moderate: medium percolation rate; slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.	Moderate: slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.
(CeF)	Fair	Fair	Moderate to severe: slopes of 15 to 45 percent.	Severe: slopes greater than 15 percent.	Severe: slopes greater than 15 percent.	Moderate to severe: slopes of 15 to 45 percent.	Severe: slopes greater than 15 percent.
(CgB, CgB2, CgC, CgC2)	Fair	Fair	Moderate: coarse fragments.	Moderate: medium percolation rate.	Moderate: coarse fragments.	Moderate: coarse fragments.	Moderate: coarse fragments.
(ClB3, ClC3)	Poor	Fair	Moderate: clayey surface layer.	Moderate: medium percolation rate.	Moderate: clayey surface layer.	Moderate: clayey surface layer.	Severe: clayey surface layer.
(ClE3)	Poor	Fair	Moderate: clayey surface layer; slopes of 10 to 20 percent.	Moderate to severe: medium percolation rate; slopes of 10 to 20 percent.	Severe: slopes greater than 10 percent.	Moderate: clayey surface layer.	Severe: clayey surface layer.

SOIL SURVEY - WAKE COUNTY, NORTH CAROLINA (continued)

Soil series and map symbols	Suitability as source of—		Degree of limitation for —				
	Topsoil	Road fill	Homebuilding sites	Septic tank absorption fields	Recreation		
					Campsites	Picnic areas	Intensive play areas
Chewacla (Cm)	Fair	Fair	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.
Congaree (Co, Cp)	Good	Fair	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding.	Severe: flooding
Enon:							
(EnB, EnB2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate.	Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate: fair trafficability.
(EnC, EnC2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate.	Moderate: slopes of 6 to 10 percent; fair trafficability.	Moderate: fair trafficability.	Moderate: slopes of 6 to 10 percent; fair trafficability.
(EnD2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate.	Severe: slopes greater than 10 percent.	Moderate: slopes of 10 to 15 percent; fair trafficability.	Severe: slopes greater than 10 percent.
Helena:							
(HeB, HeB2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate.	Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate: fair trafficability.
(HeC, HeC2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate.	Moderate: slopes of 6 to 10 percent; fair trafficability.	Moderate: fair trafficability.	Moderate: slopes of 6 to 10 percent; fair trafficability.
(HeD)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate.	Severe: slopes greater than 10 percent.	Moderate: slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.
Lloyd:							
(LdB2)	Fair	Fair	Slight	Moderate: medium	Slight	Slight	Slight

SOIL SURVEY - WAKE COUNTY, NORTH CAROLINA (continued)

Soil series and map symbols	Suitability as source of—		Degree of limitation for —				
					Recreation		
	Topsoil	Road fill	Homebuilding sites	Septic tank absorption fields	Campsites	Picnic areas	Intensive play areas
Louisburg—Continued (LoC, LwC, LwC2) (For interpretations of the Wedowee soils in LwC and LwC2, refer to the Wedowee series.)	Fair	Fair	Moderate: depth to rock is 2 to 5 feet.	Moderate: depth to rock is 2 to 5 feet.	Moderate: slopes of 6 to 10 percent.	Slight	Severe: rock
(LoD)	Fair	Fair	Moderate: depth to rock is 2 to 5 feet; slopes greater than 10 percent.	Moderate: depth to rock is 2 to 5 feet.	Severe: slopes greater than 10 percent.	Moderate: slopes greater than 10 percent.	Severe: slopes greater than 10 percent.
Madison: (MdB2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Slight	Slight	Slight
(MdC2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.	Slight	Moderate: slopes of 6 to 10 percent.
(MdD2)	Fair	Fair	Moderate: slopes of 10 to 15 percent.	Moderate: medium percolation rate; slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.	Moderate: slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.
(MdE2)	Fair	Fair	Moderate: slopes of 15 to 25 percent.	Severe: slopes greater than 15 percent.	Severe: slopes greater than 15 percent.	Moderate: slopes of 15 to 25 percent.	Severe: slopes greater than 15 percent.
Mantachie (Me)	Fair to good.	Fair	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.
Vance: (VaB, VaB2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate; shrink-swell potential.	Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate: fair trafficability.
(VaC2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate; shrink-swell potential.	Moderate: fair trafficability; slopes of 6 to 10 percent.	Moderate: fair trafficability.	Moderate: fair trafficability; slopes of 6 to 10 percent.
Wake: (WkC)	Poor	Poor	Severe: shallow to rock.	Severe: shallow to rock.	Slight to moderate: slopes of 2 to 10 percent.	Slight	Severe: rock
(WkE)	Poor	Poor	Severe: shallow to rock.	Severe: shallow to rock.	Severe: slopes greater than 10 percent.	Moderate: slopes of 10 to 25 percent.	Severe: slopes greater than 10 percent.

Soil series and map symbols	Suitability as source of—		Degree of limitation for —				
					Recreation		
	Topsoil	Road fill	Homebuilding sites	Septic tank absorption fields	Campsites	Picnic areas	Intensive play areas
Wedowee:							
(WmB, WmB2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Slight	Slight	Slight
(WmC, WmC2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.	Slight	Moderate: slopes of 6 to 10 percent.
(WmD2)	Fair	Fair	Moderate: slopes of 10 to 15 percent.	Moderate: slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.	Moderate: slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.
(WmE)	Fair	Fair	Moderate: slopes of 15 to 25 percent.	Severe: slopes greater than 15 percent.	Severe: slopes greater than 15 percent.	Moderate: slopes of 15 to 25 percent.	Severe: slopes greater than 15 percent.
Wehadkee (Wn, Wo) (For interpretations of the Bibb soil in Wo, refer to the Bibb series.)	Poor	Poor	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.
Wilkes:							
(WwC)	Fair	Poor	Severe: depth to rock 1 to 10 feet; shrink-swell potential.	Severe: depth to rock 1 to 10 feet; shrink-swell potential.	Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate: fair trafficability.
(WwE)	Fair	Poor	Severe: depth to rock 1 to 10 feet; shrink-swell potential.	Severe: depth to rock 1 to 10 feet; shrink-swell potential.	Severe: slopes greater than 10 percent.	Moderate: fair trafficability; slopes of 10 to 20 percent.	Severe: slopes greater than 10 percent.
Wilkes—Continued							
(WwF)	Fair	Poor	Severe: depth to rock 1 to 10 feet; shrink-swell potential.	Severe: depth to rock 1 to 10 feet; shrink-swell potential.	Severe: slopes greater than 20 percent.	Severe: slopes greater than 20 percent.	Severe: slopes greater than 20 percent.
(WxE)	Poor	Poor	Severe: stoniness; depth to rock 1 to 10 feet.	Severe: depth to rock 1 to 10 feet.	Severe: slopes greater than 15 percent.	Moderate: slopes of 15 to 25 percent.	Severe: slopes greater than 15 percent.

APPENDIX P

APPENDIX C

SLIDE SHOW SCRIPT

Appendix C

FLOOD HAZARD MANAGEMENT SLIDESHOW

AUDIO	VISUAL
SFX: RAIN, RUSHING WATER	SHOTS OF FLOODING IN MONTGOMERY COUNTY, TEXAS
JOYCE MACDONALD: It was terrible. We had about 15 minutes warning. I looked, and the water was just coming up like a monster. Had it happened at night, I'm really afraid that someone would have died.	
After 12 times, I quit counting.	AFTERMATH OF FLOODS
BRUCE BERRYHILL: There are certain areas that should never be developed, that people should never live in, and this particular area was a good example. Nature kept telling the people over and over again, "You have no business being here, this is my area and as long as you're here I'm going to continue to bully you until eventually you will have to get out."	
MUSIC: THEME MUSIC UP FOR TITLES, THEN UNDER	TITLE SEQUENCE
NARRATOR: Every year it costs this country about $4 billion to pay for losses due to floods. And a large part of these costs are spent again and again, as communities rebuild in flood hazard areas and take their chances with another flood.	FLOODS AND FLOOD DAMAGE IN DIFFERENT PARTS OF THE COUNTRY
Settlement in a coastal or river floodplain has always been attractive: fertile farmland, water and electric power, transportation, and recreation have been a powerful draw.	BUILDINGS IN COASTAL AREAS, NEAR RIVERS

AUDIO	VISUAL
NARRATOR (con't.) And they've induced us to forget, for a while, that a floodplain is, after all, a place where floods occur.	DAMS, LEVIES
Attempting to reduce the impact of periodic flooding, we've built structures to keep water away from us. Even though it's always been too expensive to design structures that would protect against the worst possible event, these bridges, dams and levies gave us a false sense of security about living in the floodplain.	
It's been a difficult learning experience.	FLOODS CAUSED BY DAMS BREAKING
But in recent years, we've taken a new approach. The National Flood Insurance Program, established in 1968, represented an important first step in federal efforts to reduce flood costs through non-structural measures. This program offers low-cost flood insurance to community residents and, in return, requires that communities adopt flood hazard management ordinances. These ordinances can significantly lessen the probability of greater flood damages occurring.	PICTURE OF BILL CREATING NFIP
To further emphasize the importance of sound floodplain management, the President issued the Floodplains Executive Order in 1977.	PICTURE OF EO 11988
This order requires all federal agencies to give serious consideration to the impact of their activities on floodplains. It recognizes that huge economic losses are involved when there's an unwise investment in a flood-prone area, and requires that the special character and environmental values of floodplains be considered before dollars and lives are committed to such development.	PICTURE OF PRESIDENT CARTER
The newly created Federal Emergency Management Agency represents this new thrust in federal initiatives. FEMA's six principal program offices	SLIDE SHOWING FEMA'S 6 PROGRAM AREAS

AUDIO	VISUAL
NARRATOR (con't.) coordinate federal responses to all types of natural and man-made emergencies.	
The majority of disaster relief funds over the last few years have been spent on flood-related damages. In an attempt to move away from the traditional rebuilding and reflooding cycle, FEMA, through the Federal Insurance Administration, is now helping communities to reduce future hazards through floodplain management, floodproofing and acquisition/relocation programs.	SLIDE DEPICTING FLOOD SCENE WITH FIA TITLE OTHER FLOOD SLIDES
The story of FIA's work in Montgomery County, Texas, is one of three community stories we'll be looking at. Each community had a flooding problem, and each devised its own strategy for solving that problem.	
MUSIC UP, THEN UNDER	SHOTS OF MONTGOMERY COUNTY AS IT IS TODAY
BOB CHENOWETH: In the past ten years, we've come a long way in floodplain management. Especially in the sense of the non-structural solution vs. a structural solution.	BOB CHENOWETH, WITH NAME AND TITLE ON SLIDE
For years and years the idea was that you have to go out and protect the people by building a levy or a dam or some giant project, public works project, and slowly we've been turning that around to a non-structural solution. Instead of trying to keep the water away from the people, we're trying to keep the people away from the water.	
NARRATOR: It was a solution that made sense. Whispering Oaks, a subdivision of Montgomery County, Texas, had been flooding an average of 4 to 5 times a year.	FLOOD-DAMAGED HOUSES

AUDIO	VISUAL
NARRATOR (cont'd.) It was built in 1972, as part of a huge housing boom in the area surrounding Houston. Since it was built a year before Montgomery County joined the National Flood Insurance Program, the county had not yet passed their floodplains ordinance in compliance with the Program's guidelines. This ordinance would have prohibited new construction in the floodway had it been in effect. Instead, Whispering Oaks was built squarely in an old river bed, and prospective buyers were assured that the area would not flood.	DIAGRAM OF FLOODWAY, FLOODPLAIN
JOYCE MACDONALD: We knew nothing about palmetto palms, or we would have known. Palmetto palms are plants that grow in standing water. In fact, I told the builder to please, when he leveled my yard after the house was finished, to see to it that they left those plants, because I thought they were beautiful. (laughs) Now we find out that we were actually on the river bed.	PALMS GROWING NEAR FLOOD-DAMAGED HOUSES
NARRATOR: After joining the National Flood Insurance Program, Montgomery County should have been denying rebuilding permits to the damaged structures in the floodway. They were reluctant to do that, though, since that would leave the homeowners without a place to live. In July, 1979, the regional FEMA office informed the Montgomery County officials that they risked suspension from the flood insurance program, and they would become ineligible for future flood insurance or federal disaster relief funds unless they enforced the requirements of the floodplains ordinance. At the same time, FEMA offered to work with county officials to develop a program that would move the residents' houses out of the hazard area. With this type of federal support, county officials decided to deny the permits.	COURTHOUSE IN CONROE

AUDIO	VISUAL
BOB CHENOWETH: When these permits are denied, a homeowner is left stranded with a flood insurance check for his damages, but he is at the same time unable to rebuild or repair that structure. So the Federal Insurance Administrator made a determination that where an insured property owner had received the permit denial to make his repairs with his flood insurance monies, then she construed this loss to be a total loss, and at that point made funds available to that individual up to the limits of their policy. So the individuals were able to use the $35,000 flood insurance money in combination with the Small Business Administration low-interest disaster loan (due to the fact that this area had been a Presidentially-declared disaster area), and take these funds and use them to pay off their existing mortgage, buy a vacant lot outside the floodplain, move that flood-damaged house out of the floodplain to the new location and repair it on the new location.	SEQUENCE OF HOUSE BEING JACKED UP, MOVED, AND PUT ON NEW FOUNDATION
NARRATOR (con't.): It makes a lot of sense to relocate the house out of the floodplain vs. repairing it and getting it ready for a new flood.	
NEW MUSIC UP, THEN UNDER	SCENES OF FLOODING IN BALTIMORE COUNTY
NARRATOR: Like Montgomery County, Baltimore County, Maryland has experienced tremendous growth over the last decade. And it, too, has been hard hit by flooding, much of the damage exacerbated by inadequate structures and extensive residential development in the floodplain.	

AUDIO	VISUAL
JOHN SEYFFERT: (cont'd) Baltimore County today is recovering from the building boom of the late 60's and early 70's, where the development pressures and the building activity were such that I honestly believe that the local government was just unable to keep up with it and to enforce and to adequately plan and provide for it.	JOHN SEYFFERT, NAME AND TITLE ON SLIDE
Back in the 60's, there was very little thought given to what in fact was a floodplain. There was a lot of thought given to letting houses be built near little babbling brooks and little streams, and if the stream was in the way, they could bulldoze it over a little bit, put the house in, and the stream would stay off to the side.	HOUSES LOCATED IN DANGEROUS AREAS
In the five year period from 1970 to 1975, Baltimore County suffered in state, local and federal dollar damage about $85 million worth of flood-related damage. And lost 13 citizens to floods. Which did a great deal to heighten awareness, not only of citizens, but of local politicians.	FLOOD DAMAGE
NARRATOR: This heightened awareness resulted in a determination by the county to solve its own flooding problems. A task force was created, and it found that in addition to the $85 million cost immediately evident, there were hidden costs associated with police, fire, and emergency services that brought the total even higher.	TASK FORCE MEETING
None of these expenditures were solving the basic problem. Structures like bridges or culverts might be repaired in one area, only to cause even more flooding downstream, or be damaged again during a subsequent storm.	AREA MAP BY COMMUNITY
The task force decided that the problem had to be analyzed on a watershed basis, and that a comprehensive solution had to be designed.	SAME MAP AS A WATERSHED DIAGRAM
It also made sense to take hard look at the economics of each situtation.	

AUDIO	VIS
JOHN SEYFFERT: A classic example is that we had a small, highly reactive, highly developed watershed of about 25 square miles that had flooding problems that were affecting something in the order of between 17 and 20 homes that were built in the floodplain.	EXAMPL
And what was causing the flood problems was an undersized bridge. The public works department had done a cost estimate on enlarging the bridge, which would cost about $1.8 million.	BRIDGE
The task force sat down, and identified that the 20 homes were worth about $900,000 market value, plus relocation. I made the determination that the county should buy the homes, either demolish or remove them, and turn the area into a linear park system for the community. And that was a recommendation which was made in 1976, and today is fact.	GRAPHI OF TH
NARRATOR: So far, the county has removed 172 houses from the floodplain ... without outside help.	
JOHN SEYFFERT: Part of the uniqueness of our program is that it is all local money. There is no federal money and no state money. The total package of $26 million basically came from a reallocation of priorities within the county. Instead of spending $5 million a year on storm drain improvements that really didn't resolve any problems, we are now spending that same five million dollar spending level on acquisition of flooded homes. So that we are getting a positive result.	

AUDIO	VISUAL
NEW MUSIC UP, THEN UNDER	AERIAL SHORT OF SANIBEL ISLAND
JOHN CLARK: Sanibel is a sand bar, a long one, 12 miles long, that was built by ocean forces at a distance of about 4 miles from the mainland. It's all built out of sand and wrinkles like corduroy that extend from the north tip around the south tip of the island. In the center of it is a 3,500 acre wetland swamp area with a river in it.	
The island, until recently, was a community mainly of people interested in nature, nature freaks of all kinds. But it was a prime piece of real estate, and when the coastal boom hit here after World War II, speculators' interest was drawn to Sanibel.	NATURAL BEAUTY OF ISLAND
NARRATOR: A bridge was built from the mainland, and rapid development of the island came with it.	CAUSEWAY
Canals were cut through the island, draining the wetlands in the interior. Houses were built on the canals, and on the dunes, and began to pollute the water. PORTER GOSS: Back in 1972, it became obvious to those of us living here at the time, that the kind of development that was taking place wasn't what we wanted for Sanibel at all. Uncontrolled growth really was outstripping the services and the natural systems of the island. We had a lot of building going up that wasn't safe. The type of construction that we were objecting to was construction that was put on the wrong type of foundation, too close to the water, and positioned on the island at too low a sealevel where it was perfectly obvious that a tidal surge, or any type of storm surge, was going to do some serious damage, if not knock the darn thing down.	CANALS

AUDIO	VISUAL
NARRATOR: The concerns were real. First was one of safety. Most of the people coming to Sanibel had no concept of the enormity of a coastal flood. In the event of a hurricane, it's likely the entire island would be over-washed by storm-driven waves. With only one bridge to the mainland, evacuation of a densely populated island would be impossible.	DIAGRAM OF DIFFICULTY OF EVACUATION
PORTER GOSS: We decided we absolutely had to have a managed growth policy, and we could not come to an agreement with our local government on that point. So we just went ahead and decided to incorporate ourselves as a city--we had the support of the people to do that. By becoming a city, we were able to impose our own land use planning, and implement the plan as law.	
NARRATOR: About the time of the incorporation, new federal and state laws were being passed that set more stringent standards for type and location of buildings in coastal areas. For example, regulations issued by the National Flood Insurance Program required that new development in high hazard areas be elevated on pilings and constructed to withstand hurricane force winds. In addition, mangrove stands and sand dunes were to be protected. Sanibel used all these provisions as a starting point, and came up with their own stricter guidelines.	
They imposed a future limit on the population of the island, and distributed the permitted number of new structures in accordance with the carrying capacities of natural systems.	EXAMPLE OF GUIDELINES
Strong performance standards were set for new development: distance from the beach, flood height elevation, limits of the clearing of vegetation.	

AUDIO	VISUAL
NARRATOR: (cont'd) They devised a plan for restoration of past ecological damage and insured a continuing high level of public involvement.	
PORTER GOSS: Sanibel is a place where you walk the beach at night, you maybe fish a little bit, you shell a little bit at low tide--you enjoy it for what's here. And you don't try and change it.	BEAUTY SHOTS OF SANIBEL
THEME MUSIC UP, THEN UNDER	REPRISE OF SLIDES FROM THREE EXAMPLES
NARRATOR: Creative approaches to flood hazard management are being implemented by local government across the country. These communities have analyzed their particular situations, and drawn up plans that work to reduce flooding, and also to meet other community goals.	
NARRATOR:(con't) Drawing upon technical assistance and valuable data provided through the National Flood Insurance Program, as well as other federal, state and private sources, these communities have tailored their programs to best meet *their* needs.	
END MUSIC UP, THEN UNDER	REPRISE OF SLIDES FROM OUR THREE EXAMPLES
BRUCE BERRYHILL: Something has to be done to areas that flood over and over again. Talking about it won't get it done, so let's just get in there and (this is kind of a little pun we have) and get our feet wet. Let's just go ahead and get in there and try something. If it fails, well then, we'll try something else.	

AUDIO	VISUAL
PORTER GOSS: If enough people want to get something done, it'll happen. We have been told that there is no way we can do what we've done. We've done it, and we'll continue to do it as long as the people want it to be done.	"ASSISTANCE IS AVAILABLE FROM:" STATE FLOOD INSURANCE COORDINATOR FOR OVERALL COORDINATION OF TECHNICAL ASSISTANCE, CONTACT YOUR NFIP REPRESENTATIVE IN YOUR FEMA REGIONAL OFFICE

APPENDIX D

APPENDIX D

CASE STUDY MATERIALS

HAMPTON COUNTY/CITY OF OAKTON *

Hampton is a coastal county located on a peninsula between the Atlantic Ocean and the Coral River (see attached maps). Oakton, which is located in the center of the county, is the largest city and county seat. Although the county contains other small towns, they will not be discussed in any detail in this case example.

I. Physical Characteristics

Hampton County

Located in the lower part of the coastal plain physiographic province, the topography of the county is typified by sandy ridges, sandy loam plateaus, and swampy areas of Carolina bays. Land elevations vary from sea level upward to 75 feet. Streambeds are gently sloping, with the lower reaches of most streams being under the influence of lunar tides.

The 27 miles of oceanfront is comprised of a narrow band of barrier islands and beaches, most of which are backed by the intercoastal waterway. A large portion (2/3) of these islands and beaches is currently developed at low or medium densities with seasonal and year-round homes. However, a major section of low-lying islands (Wilton Island) comprised primarily of low salt marsh is as yet undeveloped.

Approximately 19% of the county's total land area is developed for urban or industrial uses; the remaining area is comprised of agriculture and forestry, water and wetlands, and vacant land. The majority of the county is unincorporated.

The climate in the county ranges from hot and humid in the summer to cool in the winter. Rain occurs throughout the year but is heaviest in the summer and early fall.

Oakton

Oakton encompasses approximately 22 square miles and lies along the east bank of Coaral River, 26 miles upstream from its mouth and 8 miles from the Atlantic Ocean. It is the county seat and a major port along the Atlantic coast.

Numerous creeks transect the city, the most significant being Scott Creek which meanders through the northern portion of town, and James Creek running from southeast to northwest emtying into Scott Creek. Barney Creek transects the southwest portion of the town eventually emptying into Coral River. Much of the floodplain along the Scott Creek and Barney Creek is classified as riverine wooded swamp and contains a significant amount of primary and secondary wetlands. Along the Coral River, the floodplains consist primarily of brackish marsh typical of a tidal river system.

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* The case study community resembles an actual community in some respects. Facts have been changed, however, to make the case study more useful in the Institute. The study community should accordingly be considered fictitious.

Much of the city lies above the 100-year flood elevation on a bluff rising above Coral River. But some significant development does exist in the lowlands adjacent to the river and its tributaries, particularly Scott Creek, James Creek and Barney Creek. This development includes park facilities, warves, warehouses, storage tanks, commercial establishments and residences.

Little developable land remains in the area surrounding the central business district. Consequently, in recent years the areas around Barney and Scott Creeks have become increasingly attractive for development.

II. Population

The county population in 1970 was 80,000, with over 50 percent living in Oakton. Although Oakton's population increased only slightly since then, the county's population grew steadily at the rate of 2-3% per year. During the summer, tourists flock to the county's relatively unspoiled beaches, tremendously increasing the population of the coastal areas. Many summer residents are now converting beach homes to year round residences. This trend could represent a serious problem, given the low level of existing public services presently provided by the county in this area.

Because of the county's extensive and attractive coast and its solid industrial base, growth pressures are expected to continue. Many residents are beginning to express concerns about threats to their quiet rural lifestyle, environmental damage, and rising taxes resulting from unsound development.

III. Principal Flooding Problems

Hampton

Storm tides generated in the Atlantic Ocean by hurricanes and other severe wind storms are the dominant source of flooding in Hampton Couty. During extreme tides most of the barrier beach islands are overtopped to such a depth that ocean waves pass directly into the sounds, impinging on the mainland shores and entering the estuaries of the coastal streams. Heavy storms can also generate tides which move up the Coral River and into its tributaries.

Observed high water marks and tide gauge records show that ocean tides higher than 5 feet have occurred six times since 1954. The last major hurricane in 1952 destroyed over 600 oceanfront homes and damaged another 300. Most of the homes have been replaced and many new ones have been built since then. Conseqently, observers expected that damages from the next hurricane will be quite costly.

In addition to flooding from storm tides, extreme rainfalls can generate flooding in the county's numerous smaller rivers and streams. However, due to the estuarine nature of the Coral and North Coral Rivers, flood flows from these upstream tributaries have a negligible effect on river stages in Hampton County.

Currently there are no flood protection projects within the unincorporated portion of the county. Along the coast, numerous beach nourishment projects are underway in an effort to counter the natural erosive effects which have been aggravated by construction of artificial inlets.

Oakton

Storm tides are also the dominant flood source in Oakton. Generated in the Atlantic Ocean by hurricanes and other severe windstorms, these tides move up the Coral River and into its tributaries. The highest tide of record occurred during Hurricane Hazel when the Coral River reached approximately 7 feet at the foot of Cook Street. (Cook Street runs parallel and just north of Route 40.) Storm surges also caused flooding along Barney Creek and Scott Creek and lower portions of James Creek.

During extreme rainfalls, most of the creeks in Oakton are also subject to flooding from stream overflow. A severe thunderstorm in 1969 produced $500,000 worth of damages. Coral River, however, due to its estuarine nature is negligibly effected by upstream flows.

Local drainage and flood control projects involving stream channelization have been constructed along portions of James Creek, otherwise there are no flood control projects in the city. If development within the 100-year floodplain continues at its current rate, flood damages resulting from the next major hurricane can be expected to exceed $2 million.

IV. Economic/Social Considerations

Hampton

The population of the county is growing rapidly, many of the new residents attracted by water-related amenities which the county has to offer. Lands located adjacent to water have become the most attractive for residential development. Along the coast, development on the barrier islands and inland waterway has increased rapidly over the last 25 years. A sizeable portion of these areas still remains relatively undeveloped, but pressure to construct residential/recreational homes is strong. Inland, most of the new residential development is again occurring adjacent to shorelines.

Industrial development, particularly in the area around Oakton has increased tremendously in recent years and is partly responsible for the county's rapid growth. Tourism and second home development along the coast are other factors contributing significantly to the county's economic base.

The county has recently completed a land use analysis which identifies areas suitable for development. Suitability is based on a number of environmental factors, such as septic tank suitability, load supporting capability of soils, and unique values such as prime agricultural lands, wetlands, floodplain water recharge areas, etc. According to this analysis, over one half of the county is not suitable for any development whereas the rest should be developed with caution.

Oakton

The major portion of Oakton is already developed. Most of those areas still available and attractive for future development lie within the 100-year floodplain of the Coral River and James Creek. However, in recent years the city has not experienced significant growth pressures as the majority of new development within the county has occurred outside the city boundaries in the rural areas.

Existing development within the 100-year floodplain of the Coral River consists primarily of industrial and commercial activities including railroad terminals, factories, warehouses, etc., some of which must essentially be located adjacent to the river. Some residential development also exists along Coral River north of the industrial zone. Development within the 100-year flood boundaries of Scott Creek, James Creek is almost entirely residential, much of it low income, mobile home development. Development along Barney Creek is primarily middle to high income residential.

Flood damages resulting from Hurricane Hazel totaled over $1 million and city officials have estimated that due to increases in property value and new development within the flood hazard area, the next major hurricane could result in damages two to three times that figure. Seven people died during that hurricane and over 1,500 families were left homeless. Flooding resulting from heavy rains has periodically resulted in substantial damages exceeding $500,000 much of which is damage to public property such as roads, bridges and sewer and water lines. Experts project that a very heavy rain could produce close to $1 million in damages to property along James Creek and other tributaries.

V. Political Context

Hampton

Hampton County is governed by a Board of Commi
elected at large. The commissioners are generally
to the need for a strong flood hazard management pr
the county and are supportive of the state's coast
management efforts. The commissioners also recogni
importance of working closely with the incorporate
the county, particularly the city of Oakton, in de
comprehensive plan.

Some board members, however, are equally convi
need to promote continued economic development with
and recognize the high economic value of shorefron
They are reluctant to impose what they might consid
restrictive land use controls.

The County has adopted standard zoning and sub
regulations. These have recently been amended to i
the minimum requirements of the NFIP regular progr
for coastal areas: delineation of the high velocit
tion (on pilings) of new structures within the high
area to the 100-year flood level (which reflects st
but not wave height); minimum construction standard
tions on man-made alterations to sand dunes and man
Similar requirements also apply to inland flood haz
Although the county did consider additional land us
measures such as mandatory set back requirements an
of development on wetlands, officials voted these d
too prohibitive.

Oakton

Oakton has a mayor-city county form of governm
mayor is elected by the voters and has considerable
and power over actions of the city council.

The present mayor has been in office for eight
during which the city has not experienced any serio
He does not consider flooding to be a significant p
does not support the enforcement of stronger flood
management regulations.

Oakton entered the regular phase of the NFIP p
1977 having developed an acceptable floodplain mana
gram. This program consists of ordinances incorpor
their existing standard zoning regulations which es
prohibit any new development in the floodway and re
elevation of any new buildings within the 100-year
to the 100-year flood level. To date, no attempt h

to further restrict development within the 100-year floodplain or to acquire additional portions of the hazard area for recreation/open space or other purposes. (A one-mile stretch of James Creek is presently designated for recreation as is a portion of the southern shore of Barney Creek.)

Local officials have encountered very little resistance to implementing the ordinances, since they do not appear to impose an unreasonable burden on most property owners. However, officials believe there would be strong public resistance to stronger ordinances which precluded development within the 100-year floodplain or involved any sort of acquisition/relocation program. Residents in the Barney Creek area, which is one of the more exclusive sections of town, are particulary resistant to any actions which might be initiated by local officials to restrict future use of their property.

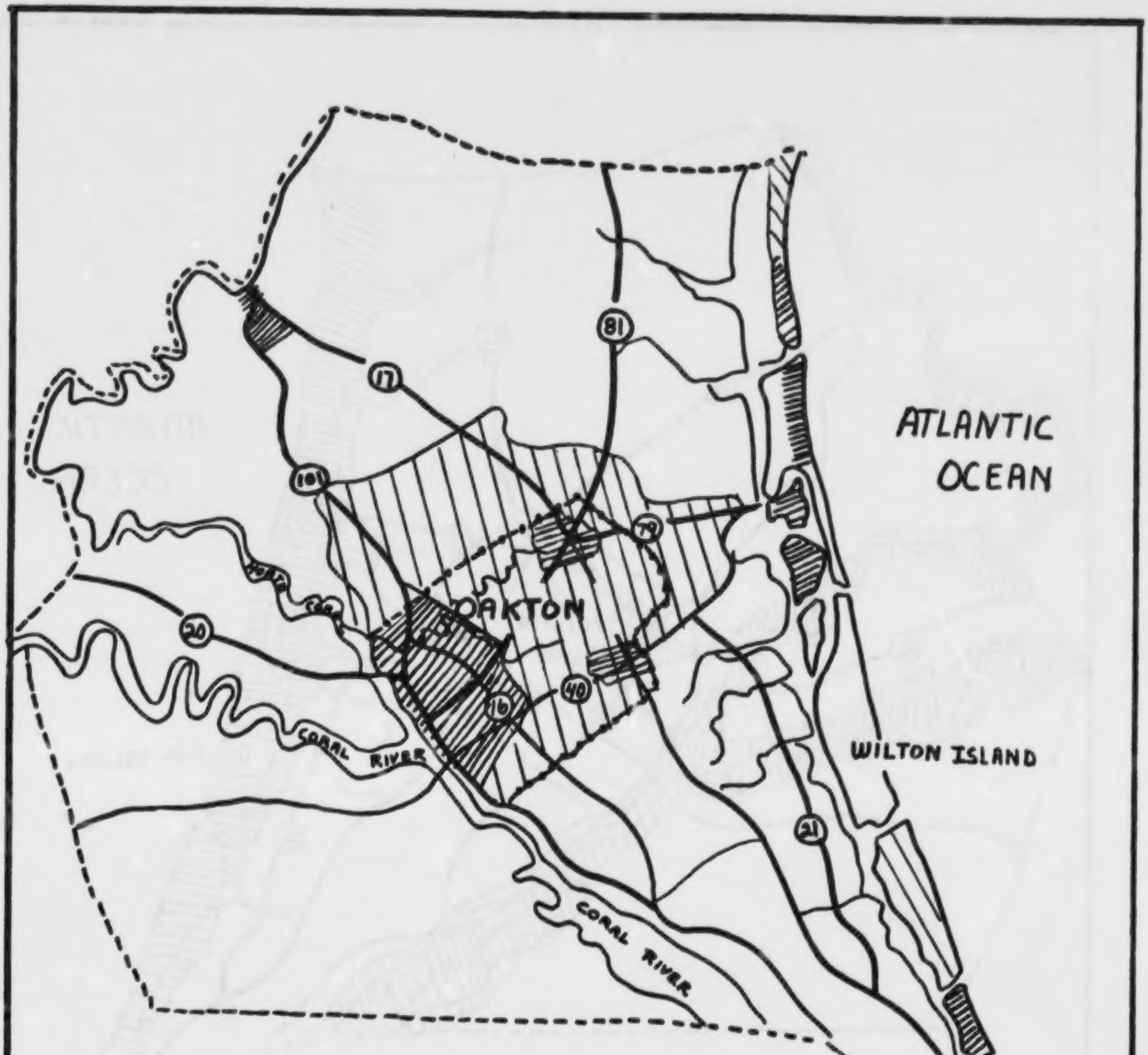
VI. Additional Institutional Considerations

The State has enacted a Coastal Zone Management program which establishes specific state policies concerning prevention of unreasonable risk in hazard areas, minimizing future flood damages, encouraging establishment of parks and open space and flood hazard areas, and protecting natural and protective values of the shoreline. The state program requires that local governments by the state to develop plans and implementation strategies.

All dredge and fill activities in navigable waters must receive a permit from the Army Corps of Engineers. The State has direct permitting authority over all coastal wetland and waterway activities and reviews all proposed development projects in these areas to ensure that the integrity of these natural resources will not be adversely affected, and that the projects are consistent with state policies including those of coastal zone management, water quality, etc.

The areawide 208 plan prepared for the county identifies storm water runoff as a major source of water pollution in the county and has recommended that local governments implement non-structural measures to mitigate the adverse impacts of future development. Suggested implementation measures include requirements for on site stormwater retention facilities for all new developments, local sediment control ordinances, and local acquisition programs to protect natural flood storage areas.

The State Comprehensive Outdoor Recreation Plan has identified an undeveloped area in the northwest corner of the town at the intersection of the Coral River and Scott Creek as a high priority recreation site.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WILTON ISLAND
OAKTON
CORAL RIVER
CORAL RIVER
NORTH CORAL
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HAMPTON COUNTY
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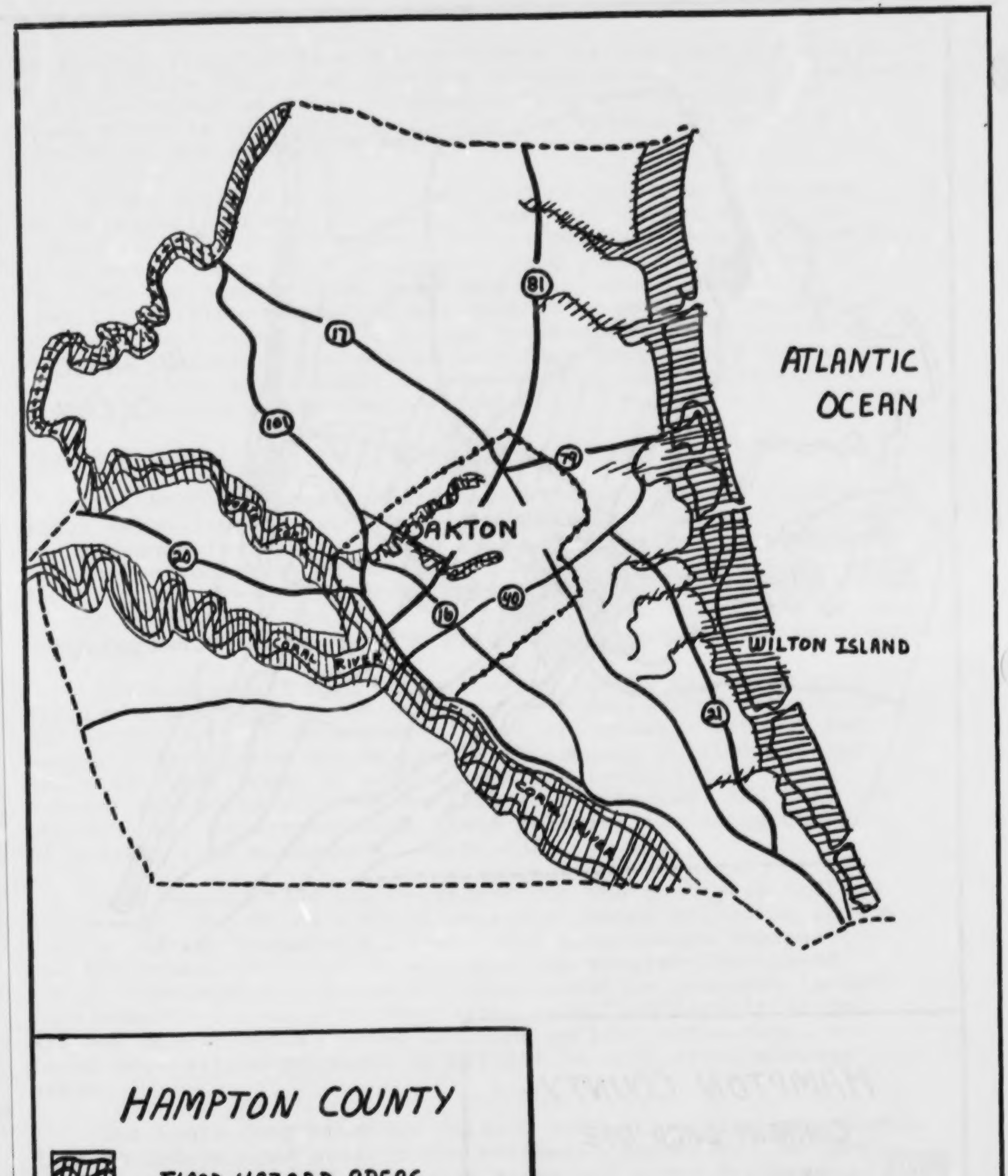
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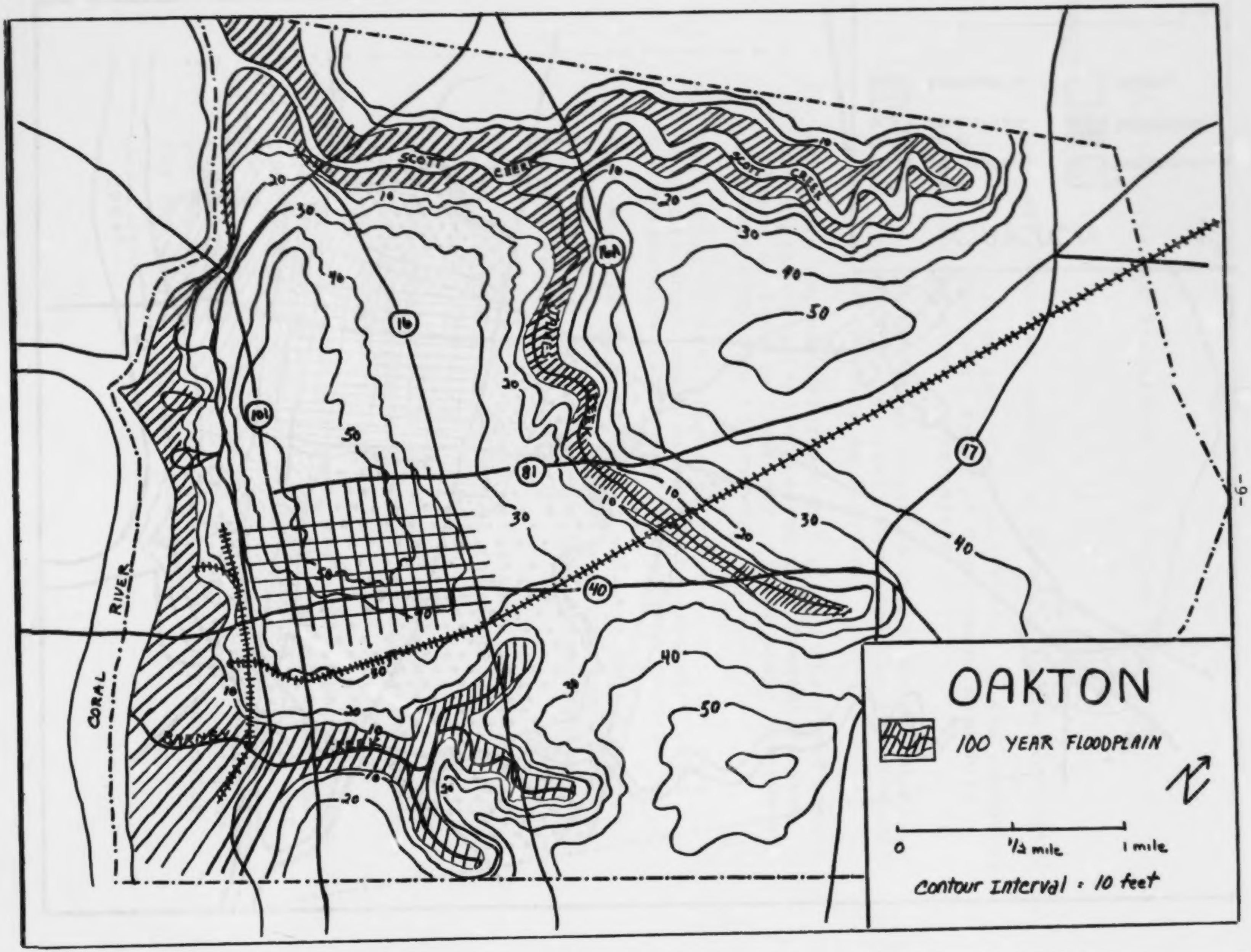
OAKTON
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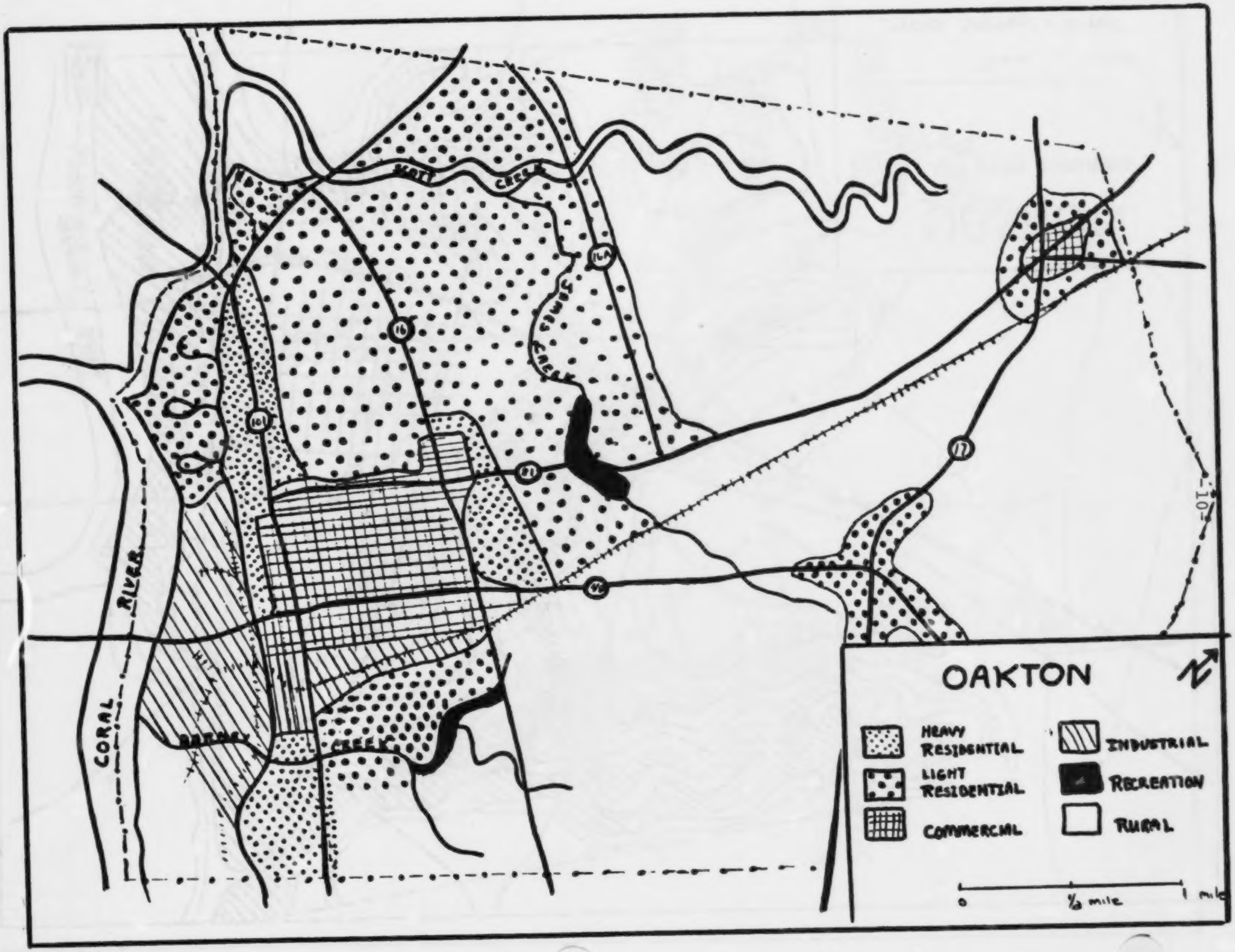
OAKTON
HEAVY RESIDENTIAL
LIGHT RESIDENTIAL
COMMERCIAL
INDUSTRIAL
RECREATION
RURAL
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½ mile
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SCOTT CREEK
JAMES CREEK
BARNEY CREEK
CORAL RIVER
16
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101
21
17
42
10

Opportunities and Strategies -- Workshop Questions

Opportunities

1. What are the major sources of flooding in the community?

2. What has been the impact of past floods in the community? In the county? What types of development presently exists in the flood hazard areas?

3. Are there factors which might increase the potential for flooding in the future? What would be the community impacts of an increase in flooding?

4. Are there any natural resources within the flood hazard area of the city, and/or county that presently serve a hazard mitigation function? If so, how? Are these currently protected in any way?

5. What other natural resources exist within the city or county which could or should be protected under a comprehensive flood hazard management program?

6. What measures (structural and non-structural) have already been taken to mitigate against flood hazards? What kinds of ordinances have been established to fulfill requirements of NFIP?

7. What types of flood hazard mitigation opportunities exist within the city? Within the county? Pre-flood situation? Post-flood situation?

8. What are some existing constraints (economic, social, political, environmental) which may affect the range of opportunities?

9. What are some possible goals for a flood hazard mitigation program in the city? In the county? How should these goals be established? Who should be involved?

10. How do the flooding problems in the city and/or county relate to those of your area? What opportunities do you foresee in your area which may or may not exist for the city/county described here?

Review Questions/Strategies

1. In addition to the existing ordinances, what types of strategies and specific tools are available to the city and the county to implement a flood hazard mitigation program? Which goals does each group of strategies meet? To which stage of flood hazard (pre, during, post) do these strategies relate?

2. How effective are standard land use controls such as zoning and subdivision ordinances? How might they be strengthened?

3. Who are the actors (federal, state, and local) likely to be involved in developing a flood hazard management strategy?

4. Who are the actors likely to have an economic stake in the adoption of a particular set of strategies? What are the social and economic impacts of various strategies?

5. How is the existing political structure in the community and in the county likely to effect the final selection of strategies?

6. How might existing flood hazard mitigation measures be included in the selection of strategies?

7. How is the political situation described in the case example similar or different in your own community/county? What strategies might be most appropriate in your community/county?

ROWLETT CREEK *

I. Regional Context/Physical Characteristics of Watershed

Rowlett Creek rises west of the city of McKinney and flows southeast to Lake Ray Hubbard on the East Fork Trinity River. The general land surface slope of the watershed is moderate or rolling. Stream slopes are steep in the upper portion of the basin and channels are deep cut into limestone with large channel capacities. Channel size and slope decrease on the main stem of Rowlett Creek in the lower half of the basin and the floodplains are relatively wide.

The drainage area of Rowlett Creek is approximately 136 square miles and includes all or portions of 10 municipalities and two counties. Approximately 8,100 acres of 9% of the total land area in the watershed lies within the 100-year floodplain.

The majority of the land area (70%) is presently used for crops and grazing. Although the area is still predominantly rural, it lies adjacent to one of the fastest growing metropolitan areas in the county. Urbanization in this watershed is proceeding rapidly and is expected to continue in the future. In particular, the cities of Richardson, Garland, and Plano have experienced phenomenal growth in residential, commercial and light industrial development in recent years.

II. Plano

Plano, with a 1977 population of 51,000 is one of the largest cities in the Rowlett Creek watershed. Its population has increased nearly 220% since 1970. This rapid population increase has resulted in a conversion of over 6,000 acres of prime agricultural land to residential, commerical and industrial purposes. Although a significant portion of the town is still devoted to agricultural purposes, increased urbanization is expected to significantly alter the community land-use patterns in the next 20 years (see attached land-use map for more details).

Because so much of the land area is devoted to grazing and crop production, forest land is extremely limited. The majority of trees are located in or directly adjacent to area creeks and drainage floodplains. These narrow strips of bottomland hardwoods constitute an area of great ecologic diversity providing an ideal habitat for a variety of plant and animal species. The majority of the community's limited wetlands are located within this bottomland hardwood forest area. The edge zones between the bottonland hardwoods and cropland or grazing land are well defined and represent another ecologically diverse area in the community.

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* The case study community resembles an actual community in some respects. Facts have been changed, however, to make the case study more useful in the Institute. The study community should accordingly be considered fictitious.

As the result of intense development pressures, many of these bottomland hardwood forests are currently being altered through clearing/grading practices which seriously threaten the ecologic value of these areas.

III. Flooding Problems

The surface in Plano is gently rolling to almost level. The town is transected by a number of narrow, well incised streams the largest being Rowlett Creek, Cottonwood Creek and Spring Creek. Rowlett and Cottonwood Creeks with their headwaters located approximately 10 miles north of Plano can be classified as having U-shaped stream valleys with relatively broad floodplains. Spring Creek, which originates within the confines of Plano, however, has a narrow floodplain more typical of a V-shaped stream valley.

Plano has experienced few major flooding problems in the past due primarily to the fact that the older portion of the city is located on the high ground between Rowlett and Spring Creeks. However, in recent years, significant new development has occurred in the vicinity of Spring Creek and Rowlett Creek, often encroaching on the floodplain. If this pattern continues, Plano could experience serious flooding problems in the future. In addition, the recent rapid watershed development in communities upstream from Plano is expected to continue and could significantly increase the future flood hazard situation in Plano. To date, no major structural alterations have been made along any of the streams in the watershed, although several have been proposed.

IV. Economic/Social Considerations

Although Plano has experienced tremendous urbanization in recent years, a great deal of undeveloped land, primarily agriculture land, still remains. While some of this undeveloped land lies within the 100-year floodplain, the majority lies outside the designated flood hazard area.

The economic base in Plano, as in the rest of the watershed, is agricultural although the town is rapidly being transformed into a bedroom community serving a nearby expanding metropolitan area. Commercial development has increased tremendously in response to the growth of residential development. Industrial development is limited in Plano but is expected to increase significantly if rapid growth in the area continues.

Most of the recent development which has occurred within the flood hazard area consists of single-family residences, mobile homes, and commercial activities. It is estimated that under existing conditions, a 10-year flood event would produce nearly $400,000 in damages and a 100-year flood would produce over $1.5 million in damages. Continued rapid growth within the Rowlett Creek watershed and particularly within Plano is expected to increase these damage estimates significantly, unless strict development controls are implemented.

The existing sewage treatment facility located at the confluence of Rowlett and Cottonwood Creek, presently serves only the downtown area. However, city officials are considering extending sewer service to the area of Rowlett Creek due north of the treatment plant as this are contains a number of single-family residences with failing septic systems.

V. Political Context

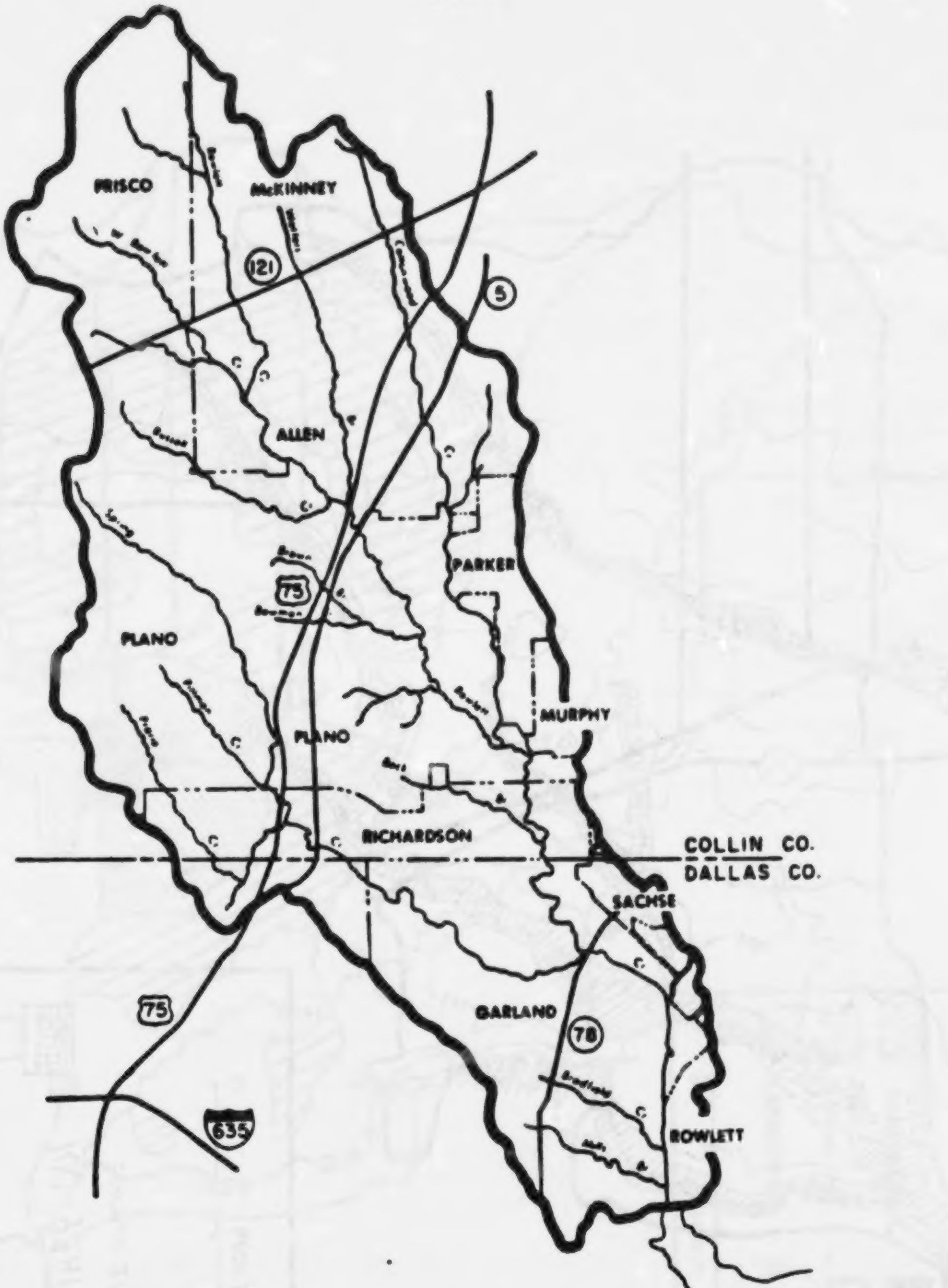
Plano is only one of ten communities sharing the Rowlett Creek watershed. Situated as it is in the center of the watershed, Plano's flooding situation is likely to be impacted by development in upstream communities. In addition, development activities within Plano may in fact contribute to flooding problems downstream. Although the merits of intergovernmental cooperation within the watershed are obvious, as yet there is no formal mechanism to achieve such cooperation.

The city of Plano is governed by a mayor who strongly favors continued growth. Development controls are not popular among many community residents, particularly the business interests who have realized a significant profit from the recent boom. The community has adopted standard zoning and subdivision ordinances. These have been amended to incorporate the minimum requirements of the NFIP including delineation of floodway district and a floodplain district, requirements for elevating new structures within the floodplain to the 100-year flood levels and limitations on new development within the defined floodway. However, the ordinances are not well enforced. Since the bottomland hardwood forests are the most attractive areas for residential development, city officials have been reluctant to impose serious constraints on building in these areas. The community has not yet experienced any significant flooding and, therefore, is unconvinced of the need for a comprehensive flood hazard mitigation program.

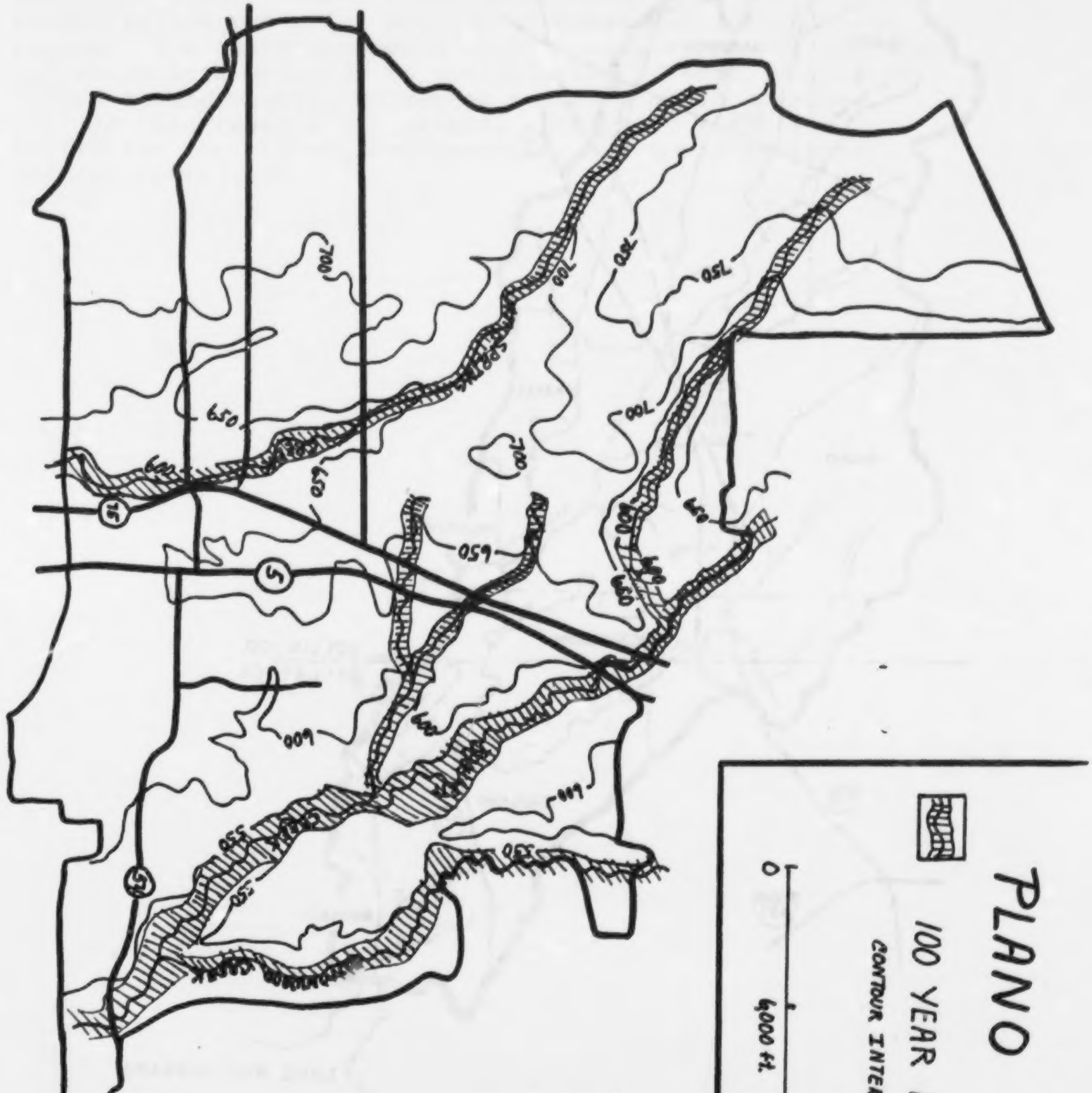
VI. Additional Institutional Considerations

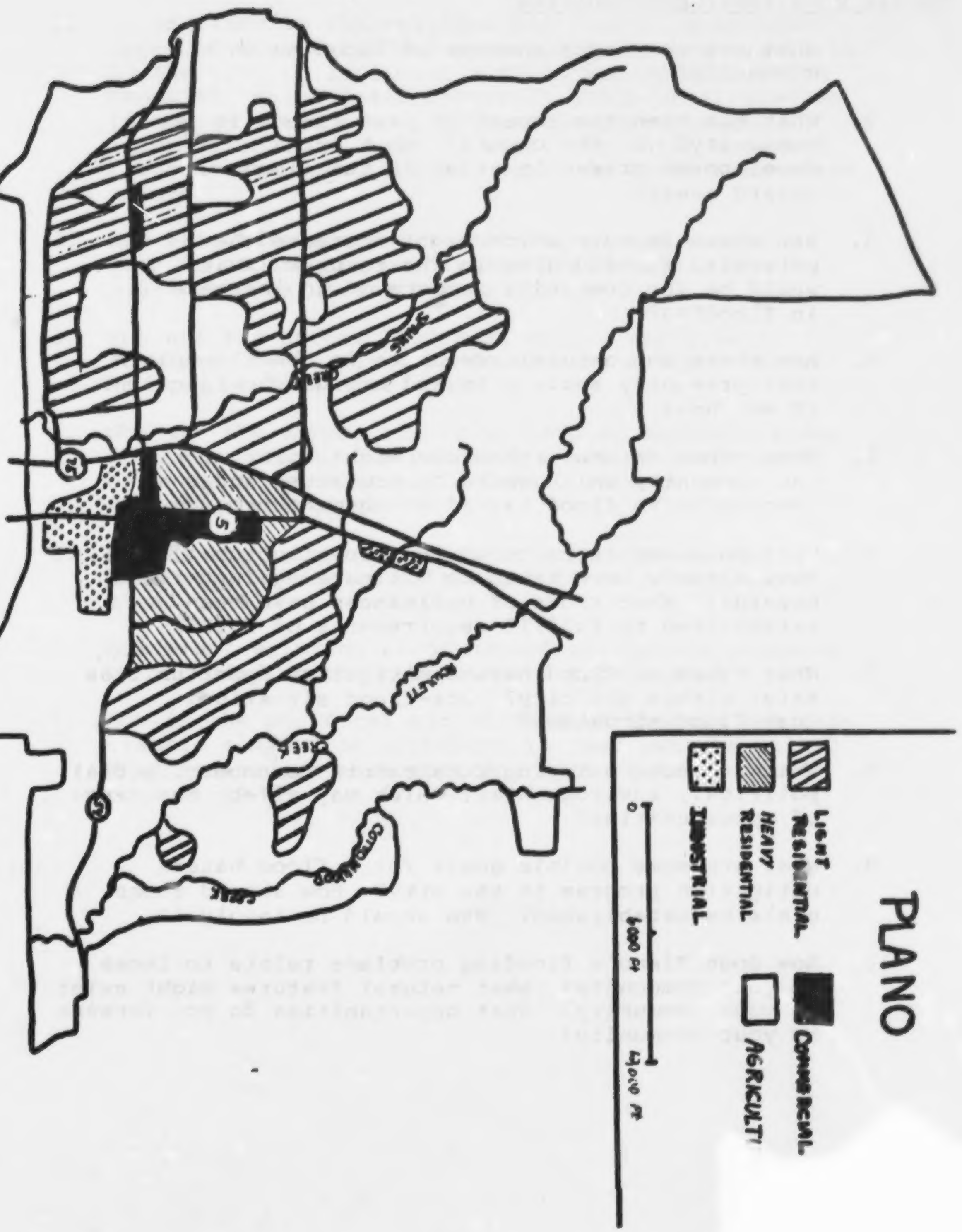
The state has recently adopted a floodplain law which establishes a 0.5 foot rise floodway and essentialy prohibits new development within the floodway. Local governments are required to review proposed new development projects within the 100-year floodplain to ensure that they will not produce an increase in flood heights that exceeds 0.5 feet.

The area-wide 208 plans prepared for the two counties involved identify urban storm water runoff and agricultural runoff as the two major sources of water pollution in the region. The plans recommend that local governments implement non-structural measures to mitigate the adverse impacts of future developments. Suggested implementation measures include requirements for on-site stormwater retention facilities for all new developments, and local sediment control ordinances.


FRISCO
McKINNEY
121
5
ALLEN
PARKER
75
PLANO
PLANO
MURPHY
RICHARDSON
COLLIN CO.
DALLAS CO.
SACHSE
75
GARLAND
78
635
ROWLETT
LAKE RAY HUBBARD

**ROWLETT CREEK BASIN
VICINITY MAP**


PLANO
100 YEAR FLOODPLAIN
CONTOUR INTERVAL = 50 ft.
0
6000 ft.
12,000 ft.
750
700
650
600
550
75
5
CREEK


PLANO
LIGHT RESIDENTIAL
HEAVY RESIDENTIAL
INDUSTRIAL
COMMERCIAL
AGRICULTU
0
6000 Ft
12,000 Ft
SPRING CREEK
ROWLETT CREEK
COTTONWOOD CREEK
75
5
75

Review Questions/Opportunities

1. What are the major sources of flooding in the community?
2. What has been the impact of past floods in the community? In the county? What types of development presently exist in the flood hazard areas?
3. Are there factors which might increase the potential for flooding in the future? What would be the community impacts of an increase in flooding?
4. Are there any natural resources in the floodplain that presently serve a hazard mitigation function? If so, how?
5. What other natural resources might exist within the community which would be protected under a comprehensive flood hazard management program.
6. What measures (structural and non-structural) have already been taken to mitigate against flood hazards? What kinds of ordinances have been established to fulfill requirements of NFIP?
7. What types of flood hazard mitigation opportunities exist within the city? Pre-flood situation? Post-flood situation?
8. What are some existing constraints (economic, social, political, environmental) which may affect the range of opportunities?
9. What are some posible goals for a flood hazard mitigation program in the city? How should these goals be established? Who should be involved?
10. How does Plano's flooding problems relate to those of your community? What natural features might exist in your community? What opportunities do you foresee in your community?

Review Questions/Strategies

1. In addition to the existing ordinances, what other types of strategies and specific tools are available to the city to implement a flood hazard mitigation program? Which goals does each group of strategies (planning, regulation, acquisition/development, informational, financial) meet? To which stage of flood hazard (pre, during, post) do these strategies relate?

2. How effective are the standard land use controls such as zoning and subdivison ordinances? How might they be strengthened?

3. Who are the actors (federal, state, and local) likely to be involved in developing a flood hazard management strategy?

4. Who are the actors likely to have an economic stake in the adoption of a particular set of strategies? What are the social and economic impacts of various strategies?

5. How is the existing political strucutre in the community likely to effect the final selection of strategies?

6. How might existing flood hazard mitigation measures be included in the selection of strategies?

7. How is the political situation described in the case example similar or different in your own community? What strategies seem most appropriate for your community?

Notes:

APPENDIX E

SIMULATION EXERCISE (PAGAN)

RIVERINE

PLANNING for ACTS of GOD AND NATURE

PAGAN - River

by

Allan G. Feldt, The University of Michigan

and

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ACKNOWLEDGEMENTS

This game was developed for presentation at a series of Community Flood Hazard Management Training Institutes sponsored by the Federal Emergency Management Agency. While the authors accept responsibility for the general content of the materials presented here, we are indebted to a number of persons and agencies for materials and ideas. Among others these include the U.S. Army Corps of Engineers, Fort Worth District, for materials derived from their Rowlett Creek studies, Katherine Warner of the University of Michigan, Clem Rastatter of the Conservation Foundation, and Shannon Berger and David Feldt of Legacy Press.

OPERATING CHARACTERISTICS: PAGAN is designed to be played in about three hours including debriefing. The first round should take about one hour allowing ten minutes for each of the six steps of play. Later rounds should take about one-half hour each with 5 minutes for each step. The game can theoretically be run with as few as three or as many as 142 persons by assigning up to 3 persons to each of the 42 interest groups and to the 12 elected governmental positions. A separate table or room is needed for each ward plus each governing body plus one for the game operator and accountant. For a full run of all three jurisdictions and all wards this would mean a total of 15 well separated tables or rooms arranged spatially in a pattern approximating their geographic locations. Except for a pair of probability dice or their equivalent and a land use map of the three towns, all materials required for the game are provided in this printout.

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[illegible]

AN INTRODUCTION TO SIMULATION/GAMES

Simulation/games have been widely used in many disciplines to represent the complexities of multiple decisions under conditions of uncertainty. They have been used in military training excercises for over 150 years, in business management training for over thirty years, and in urban planning for over fifteen years. Through deliberate abstraction of a problem to it's basic elements, simulation/games allow participarts of widely varying backgrounds to gain an overview of the problem being considered which can clarify and broaden their perspective when they are faced with similar though more detailed issues in the "real world." In addition to providing an overview, games also collapse time, thereby enabling a player to see the effects of decisions over many years in the course of a few hours of play.

Most simulation/games consist of three principle elements plus a variety of artifacts in written, mathematic, graphic, or physical form whose purpose is to record or convey information to players. The first principle element is the Scenario - the data and description of the time and place being represented in the game. The second element is the Roles - the primary actors in the game including descriptions of who they are, what their relative interests and strategies may be, and what their status is at the beginning of the game. The third element is some form of Accounting System - which records the decisions of players and determines what impact they have on the scenario and the roles. The accounting system must also feed some or all of this information back to the players on a regular basis as a guide to future decision making.

Most games are played over a series of time periods called "rounds" approximating some amount of time in the "real world" ranging from hours to decades. Similar activities usually take place each round with players making more rapid and sophisticated decisions in later rounds, as they become more familiar with the game and it's rules. The first round is often very confusing since players must learn to understand both the mechanics of the game and the factors influencing their decisions. In later rounds confusion over rules and game mechanics dissipates while the complexity of decisions may increase due to the increasing sophistication of the players plus the increasing effect of decisions accumulated from previous rounds.

Simulation/games can be reasonably accurate representations of the "real world" situations they depict but their outcomes should not be interpreted as predictive of how real events are likely to turn out. Simulation/games are merely representations of how various components interact. The assumptions of the persons designing them plus the decisions of the players themselves strongly effect the outcome. Such an outcome represents at best only one of many possible worlds which could emerge in the "real world" system being modeled. Thus all simulation models, regardless of their complexity can never be anything more than instructional devices allowing us to observe and experiment with possible futures.

OVERVIEW

PURPOSE: PAGAN attempts to provide an understanding of the conflicting interests involved in developing a flood hazard management program. Based on case study materials, the game requires players to try to resolve the conflict between advancing their own interests through acquiring more property and points (currency) and protecting their own and the community's interests through providing an adequate level of flood protection.

GAME STEPS: The game is played in successive rounds, each of which consists of six steps that take place over a time period representing five years. During each round, players are exposed to varying size storms and must consider the resulting costs of disasters that arise through their own activities, the activities of their neighbors and Acts of God And Nature. The steps are:

1) Weather -- Establish the amount of damage which has occurred through floods during the previous five years;

2) Points-- Establish the points (currency) earned by each player;

3) Taxes -- Local governments assess and collect taxes;

4) Development -- Individual players develop additional units of land in order to accumulate wealth (points);

5) Protection -- The community establishes the desired level of flood protection.

6) Local Government Action -- Referendums, elections, and public meetings to establish future strategies to complete passage of floodplain ordinances, and to elect new local officials if necessary.

SCENARIO: The action takes place in the three adjacent towns of Plano, Richardson, and Garland, a rapidly suburbanizing area in the Rowlett Creek drainage district just outside a major metropolitan area. The area has suffered very little flood damage in the past but local authorities have warned of increasing possibilities of major floods due to developments in the area over the past decade. The amount of damage which might be sustained in future floods will be determined by both the type of development involved and the level of flood protection provided by local authorities. Players may influence the level of hazard protection and the degree of community development by investing points towards either or both of these options. Points received in later rounds depend upon how well the interests of each team were met in earlier rounds.

ROLES: The three towns are made up of wards each of which in turn contains a number of interest groups represented by assigned game roles. Interest groups vary among the different areas but generally consist of Low Income Households, Middle Income Households, Upper

Income Households, Local Business, Local Co
Agriculture, Local Government elected by the players i
township, and representatives of the Federal Emerge
Agency (FEMA). Each ward or township is seated at a
with the three communities located in different parts o
in separate rooms. The central task facing
individually and as a group is to reach an agreement
interests on the type of growth desired and the d
protection to be provided. Cooperation among wards, in
and communities is encouraged but is hampered b
communication, differing interests and differing perce
problems faced.

ACCOUNTS: The basic variables in PAGAN are 1) the
of a given type controlled by each player; 2) the a
that land receives each round; 3) the number of point
receives as a result of land holdings and damages; 4) t
by local governments; and 5) the level of flood prote
Both players and the game operator keep records on the
five variables during play and their figures are reconc
when PAGAN Points are paid out.

THE TOWN OF PLANO

The three towns of Plano, Richardson, and Garland make up the lower half of the Rowlett Creek Basin, occupying about 66 square miles, 75% of which is still in agriculture or grazing. About 9,900 acres or 23% of the area lies within the 100 year flood plain of Rowlett Creek, Cottonwood Creek, Spring Creek and their numerous tributaries. Prior to 1960 the area was almost exclusively farm and grazing land but rapid expansion of nearby metropolises has resulted in major developments of residential and commercial land uses as well as some expansion of light industrial uses. The growth rate of the three cities over the past decade has been very high.

Plano grew at a rate of 11.1% per year over the past decade, increasing its 1970 population of 23,500 to 71,300 in 1980. Although over 70% of the town is still in agricultural use and almost 7% is vacant, continued population pressure over the next few decades is expected to reduce these percentages significantly.

Plano is drained by 3 major creeks and their tributaries. Rowlett and Cottonwood Creeks to the East drain the large town of McKinney upstream and have broad flood plains extending 400-1000 feet on each side of the creek beds. Spring Creek to the West is more deeply incised, drains a less urban hinterland, and has a narrower flood plain. Past flooding has been minor but new developments in and around the Spring Creek and Rowlett Creek floodplains plus continued development of the City of McKinney may cause much more serious problems in the future.

The economic base of Plano is still primarily agricultural, although commercial, industrial and residential land uses have begun to become more dominant. Recent developments in flood prone areas have led local authorities to estimate that a "10 year flood" would cause several hundred thousand dollars in damage to properties in the city while a "100 year flood" would cause well over a million dollars in damage. Furthermore, upstream developments have begun to change run off characteristics in the local watershed such that the probability of severe floods has been significantly increased in recent years.

The older developed sections of Plano have experienced little flooding in the past due to their location on the high ground between Rowlett and Spring Creeks. Recent single family houses and mobile home developments have occured to a considerable degree in or near the flood plains of the creeks and their tributaries. These developments in turn have begun to change local run off characteristics and have begun to affect downstream flooding probabilities.

The mayor and most local business people strongly advocate continued growth and oppose any form of controls which might inhibit the current development boom. The community has adopted minimum NFIP requirements (Level II Table II) including designation of the 100 year flood plain and requiring elevation of new structures built within the flood plain. Pressures for continued development in the attractive wooded areas along the creeks and the lack of any important history of flooding activities have combined to produce very lax enforcement of these new regulations, however. Recent state regulations and 208 planning studies have reccmmended that local authorities prohibit further development in the flood plain and also take steps to minimize storm water run off and pollution through the creation of storm water retention basins and strict enforcement of local sediment control ordinances. Public officials of Plano have not yet taken any steps to follow through on these recommendations.

Plano is made up of five political wards with a diversity of interest groups in each. Ward One consists of the older city center plus much of the recent industrial and commercial growth. Residents are from the middle and lower income classes and there are no agricultural or conservationists interests in the ward at this time. This area is well above the "hundred year" flood line and is expected to suffer very little flood damage in even the most severe flood. (Low Income, Mid Income, and Business)

The Second Ward lies just west of the downtown area and contains a little commercial development plus a small industrial park. Residents are predominantly middle income in lower density residential developments although a few low income residents are found in high density residences near the business district and in low density residences just beyond the industrial park. Several farms still exist in this ward butthere are no conservationist interests at this time. About 520 acres of Ward II are located in the flood plain and 160 of these acres contain residential or industrial developments. (Low Income, Mid Income, High Income, Business, Agriculture)

The Third Ward occupies the northwest part of Plano and makes up the major agricultural part of the city. Population is middle and upper income occupying low density residential units in the lower part of the ward. Several parks provide some strength to conservationist interests in this ward although the predominant interest group tends to be agriculture. About 1360 acres lie in the flood plain of either Spring or West Rowlett Creek and 120 of these acres are developed in low density housing occupied by middle income groups. (Mid Income, High Income, Conservation, and AGriculture)

The Fourth Ward lies directly north of the downtown area and is heavily cut by branches of Rowlett Creek and its tributaries. Most development consists of low and high density residential areas along the southern edge of the ward together with a small commercial development. A group of low income families occupying mobile homes spread along one of the creeks and a large new industrial complex just north of that make up the rest of the non-agricultural uses in the ward. About a third of the ward lies within the "hundred year" flood plain and about 160 acres of the flood plain contains developed properties. (Low Income, Mid Income, Business, and Agriculture).

The Fifth Ward occupies the sparsely settled eastern third of Plano. It contains only a few lower density residential areas all located in the beautifully wooded floodplains of Rowlett Creek and its western tributary draining the downtown area. Several pleasant parks are located here as well but the predominant interests are agriculture. Almost forty percent of Ward V lies within the flood plain including all 240 acres of current residential development. (Low Income, Mid Income, High Income, Conservation, and Agriculture).

TABLE IA. Acres of Land Use by Type, "Owner," and Location - Town of Plano

Use Type	Owner	Ward					Total
		I	II	III	IV	V	
Low	Lo Inc. .	40	120	0	160	80	400
Density . .	Med. Inc.	80	680	720	320	40	1,840
Residences	Hi Inc. .	0	40	200	0	120	360
High . . .	Lo Inc. .	240	40	0	120	0	400
Density . .	Med. Inc.	0	40	0	120	0	160
Residences	Hi Inc. .	0	0	0	0	0	0
Commerce .	Business	360	80	0	40	0	480
Industry .	Business	360	40	0	120	0	520
Parks Rec.	Conserv.	0	0	120	0	80	200
Agriculture	Agricult.	0	1,280	6,400	1,920	5,120	14,720
Vacant . .	Operator	440	400	440	80	40	1,400
TOTAL . . .	....	1,520	2,720	7,880	2,880	2,160	20,480
..IN FLOOD	.PLAIN .	0	520	1,360	1,080	2,160	5,120

TOWN OF RICHARDSON

The three towns of Plano, Richardson, and Garland make up the lower half of the Rowlett Creek Basin, occupying about 66 square miles, 75% of which is still in agriculture or grazing. About 9,900 acres or 23% of the area lies within the 100 year flood plain of Rowlett Creek, Cottonwood Creek, Spring Creek and their numerous tributaries. Prior to 1960 the area was almost exclusively farm and grazing land but rapid expansion of nearby metropolises has resulted in major developments of residential and commercial land uses as well as some expansion of light industrial uses. The growth rate of the three cities over the past decade has been very high.

Richardson occupies a narrow strip of land about one mile wide by six miles long between Plano and Garland Cities. Richardson's population has grown at a rate of 7.7% per year since 1970, increasing its size from 8,100 persons in 1970 to 17,500 persons in 1980. Although over 55% of the city is still in agricultural use and almost 7% is vacant, continued population pressure over the next few decades is expected to reduce these percentages significantly.

Richardson is heavily cut by Spring and Rowlett Creeks and their tributaries. Over 30% of the land area lies within the hundred year floodplain of these two creeks and their tributaries, including 440 developed acres. No history of flood damage in Richardson exists at all since until quite recently the town was almost completely agricultural in its development. The area is expected to undergo increasingly severe flooding problems, however, due to the heavy development occuring upstream in both Plano and McKinney. Indeed, local experts have indicated that the probability of "10 year" and "100 year" floods are now substantially greater than the normal 10% and 1%, respectively. While still largely agricultural, recent subdivisions have resulted in the conversion of almost a thousand acres to residential and commercial uses.

Local residents and officials are more amused than concerned over recent growth, chuckling among themselves at the outlandish prices the "city folks" are willing to pay for almost worthless grazing land. Town officials reluctantly agreed to entering the emergency phase of the NFIP program (Level II, Table II), requiring specification of the hundred year flood plain and assurances that the town will begin efforts to more closely regulate developments in the floodplain. Local opinion is that this step is just some more federal paperwork that has to be done to keep the state and federal government people happy. No one in Richardson takes the matter very seriously. As such, property owners in Richardson are entitled to 50% reimbursement for damages sustained for one occurence only. Subsequent damages will not be covered by insurance unless the community enters a regular program at a higher level of protection.

Richardson is made up of only two wards with most development occuring in the western First Ward. The First Ward contains a small commercial district and industrial district plus a scattering of low and high density residential areas occupied by all three income classes. Six hurdred and eighty of the First Ward's 2,200 acres lie within the hundred year flood plain and 240 of these acres are occupied by low density housing occupied primarily by middle income residents. Agricultural interests are still an important part of First Ward activities but several large farms have succumbed to the higher prices being offered for urban land uses and only 1,280 acres remain in agriculture. (Low Income, Mid Income, High Income, Business, and Agriculture)

The Second Ward is even more sparsely populated containing only 200 acres of low density residential developments, all located within the hundred year flood plain. A small business district, 80 acres of parks and several large farms make up the rest of the Second Ward. (Mid Income, High Income, Business, Conservation, and Agriculture)

TABLE IB. Acres of Land Use by Type, "Owner," and Location - Town of Richardson

Use Type	Owner	Ward		Total
		I	II	
Low	Lo Inc. .	160	0	160
Density . .	Med. Inc.	200	160	360
Residences	Hi Inc. .	0	40	40
High . . .	Lo Inc. .	0	0	0
Density . .	Med. Inc.	40	0	40
Residences	Hi Inc. .	40	0	40
Commerce .	Business	120	40	160
Industry .	Business	80	0	80
Parks Rec.	Conserv.	0	80	80
Agriculture	Agricult.	1,280	1,920	3,200
Vacant . .	Operator	280	0	280
TOTAL . . .	....	2,200	2,240	4,440
..IN FLOOD	.PLAIN	240	200	440

THE TOWN OF GARLAND

The three towns of Plano, Richardson, and Garland make up the lower half of the Rowlett Creek Basin, occupying about 66 square miles, 75% of which is still in agriculture or grazing. About 9,900 acres or 23% of the area lies within the 100 year flood plain of Rowlett Creek, Cottonwood Creek, Spring Creek and their numerous tributaries. Prior to 1960 the area was almost exclusively farm and grazing land but rapid expansion of nearby metropolises has resulted in major developments of residential and commercial land uses as well as some expansion of light industrial uses. The growth rate of the three cities over the past decade has been very high.

Garland grew at a rate of 9.2% per year over the past decade, increasing its 1970 population of 13,400 to 33,600 in 1980. Although over 83% of the town is still in agricultural use and almost 2% is vacant, continued population pressure over the next few decades is expected to reduce these percentages significantly.

Garland is drained by Rowlett and Spring Creeks, the latter joining the Rowlett just south and east of the downtown business district. The flood plain of Rowlett Creek is quite broad in Garland, extending to as much as 1500 feet on each side of the creek bed in some areas. While flooding has been only a minor problem in the past, substantial new developments up stream plus a number of developments within the flood plain of Rowlett and Spring Creeks make the likelihood of significant damage from future floods much greater than in the past. State and federal officials have estimated that flood damages could range from several hundred thousand dollars for a "ten year" flood up to almost a million dollars for a "hundred year" flood. They also warn that the probabilities of such floods occuring has increased due to changes in run off patterns incurred by substantial urban development in McKinney, Plano, and Richardson.

The economic base of Garland is still primarily agricultural, although industrial and commercial uses have begun to impinge on farm lands, particularly in the first and third wards. Over half of the agricultural lands are located in the southern Third Ward with the balance fairly evenly divied between the other two wards.

Local officials have thus far been delighted with the recent increase in town population and business activity. They have been actively promoting Garland as a primary commuting suburb of the nearby metropolis, especially emphasizing the amenities to be found in the southern parts of town around Lake Roy Hubbard into which Rowlett Creek drains. The community has adopted minimum NFIP requirements (Level II, Table II) including designation of the hundred year flood plain and requiring the new structures in the floodplain be elevated to the level of expected hundred year floods. Controversy still surrounds this move, however, since it is seen by some as inhibiting further growth and development. Thus far, enforcement of the requirements has been lax. Recent state regulations and recommendations stemming from local 208 plan studies have suggested that local authorities prohibit further development in the flood plain and that they minimize storm water run off and pollution through the creation of storm water retention ponds and enforcement of local sediment control ordinances.

Garland is made up of three political wards each electing one representative to the town board. The First Ward is made up of the original downtown area and its recently expanded business and residential district. Almost all housing in the area contains Middle Income Residents except for a 40 acre high density public housing project just north of the downtown business district and a few low income residents on the southern edge of the downtown area. Nine hundred and twenty acres of Ward One lie within the floodplain of Rowlett or Spring Creeks and 440 of these acres contain some kind of land use development. Three thousand eight hundred and forty acres of Ward One are still in agricultural uses. (Low Income, Mid Income, Business, and Agriculture).

The Second Ward lies on the eastern boarder of Garland and its developments are largely extensions of the downtown developments found in Ward One. This consists of a small Industrial area and a scattering of Low and Middle Income residents occupying both low and high density residential areas. Seven hundred and sixty acres of Ward Two lie in the flood plains of Rowlett Creek and 360 of these acres contain developed properties. Over 3,000 acres are still in agricultural uses and Conservationist interest are represented in an eighty acre park just outside the Rowlett Creek floodplain. (Low Income, Mid Income, Business, Conservation, and Agriculture).

The Third Ward occupies the southern half of Garland and abuts the increasingly popular summer home area bordering Lake Roy Hubbard. An Industrial area along the northern border lines the banks of Rowlett Creek just outside the hundred year floodplain. Residential units in the southern lake shore area are exclusively High Income residents while a few Low Income residents are found in the north western part of the ward. Most of the ward is still made up of farming and grazing lands comprising a total of 8,360 acres. One thousand seven hundred and twenty acres lie within the hundred year flood plain of Rowlett Creek with 240 acres currently occupied by industrial or residential developments. (Low Income, Mid Income, High Income, Business, Conservationists, and Agriculture).

TABLE IC. Acres of Land Use by Type, "Owner," and Location - Town of Garland

Use Type	Owner	Ward			Total
		I	II	III	
Low	Lo Inc. .	40	80	120	240
Density . .	Med. Inc.	760	280	0	1,040
Residences	Hi Inc. .	0	0	40	40
High . . .	Lo Inc. .	40	0	0	40
Density . .	Med. Inc.	120	80	0	200
Residences	Hi Inc. .	0	0	120	120
Commerce .	Business	400	0	40	440
Industry .	Business	80	80	160	320
Parks Rec.	Conserv.	0	80	80	160
Agriculture	Agricult.	3,840	3,200	7,680	14,720
Vacant . .	Operator	160	40	120	320
TOTAL . . .	....	5,440	3,840	8,360	17,640
..IN FLOOD	.PLAIN .	960	760	1,720	3,400

ROLE DESCRIPTION - FEMA OFFICIALS (1 Team)

As employees of the Federal Insurance Administration you have two primary responsibilities relating to the residents of the area.

1. You will administer flood insurance payments to property owners who sustain damage as the result of a flood. Payments will be conditioned as follows:

   a) The Community must be enrolled in the National Flood Insurance Program. At the start of the game all communities are in the NFIP program. However, they do have the option to drop out if they choose.

   b) Property owners from eligible communities must request payment on the appropriate forms (available only from FIA officials) indicating they have in fact purchased a flood insurance policy.

   c) For the first flood even you will pay all eligible property owners who request reimbursement 50% of the total damage sustained.

   d) If, in subsequent rounds of play, property owners again sustain property damage you may not provide any reimbursement unless the community in which the property owner lives has adopted Flood Protection Level III or higher. If the community has adopted the appropriate level of flood protection, you may again reimburse property owners 50% of total damages sustained.

2. You may provide technical assistance to local communities upon request.

In order to accomplish your tasks most effectively, you may want to appoint certain FIA officials to handle Flood Insurance and others to provide technical assistance.

APPLICATION FOR NATIONAL FLOOD INSURANCE PAYMENT

Name/Role: ____________________

Location: __________________

Round: ___

Land Use Type: ___________

No. Acres Damaged: __________

Value (Acres Damaged/40): __________

Business Value (Acres Damaged/20): ______

Amount Requested (To maximum of 50% of damage: _______

Amount Awarded: $________

Request Denied: (explanation) ________________
____

____

(Signature of FIA Official)

APPLICATION FOR NATIONAL FLOOD INSURANCE PAYMENT

Name/Role: ___________________

Location: __________________

Round: ___

Land Use Type: ___________

No. Acres Damaged: __________

Value (Acres Damaged/40): __________

Business Value (Acres Damaged/20): ______

Amount Requested (To maximum of 50% of damage: ______

Amount Awarded: $_______

Request Denied: (explanation) _______________
____

____

(Signature of FIA Official)

ROLE DESCRIPTION - LOCAL GOVERNMENT (1-3 Teams)

As elected officials you are responsible for the health and safety of your constituents as well as maintaining a stable and efficient community. The issues of community growth, flood and hurricane protection, and the management of frictions between other community groups are your foremost concerns, though other goals may also guide your decisions. Your performance will be judged by your constituents in an election at the end of every second round.

Local government has 4 basic powers:

a). You may collect taxes on the PAGAN points received by residents of your jurisdiction. The initial rate is 10% and it may be increased to as much as 40%. If Flood Protection Level V is passed it may reach 50%. The new tax rate must be announced at the end of each round or it is assumed to remain the same as in the previous round.

b). You may place reasonable restrictions on new development by zoning certain areas within your jurisdiction for limited kinds of land uses or for no development at all. You may modify the existing requirement for "balanced" development by requiring developers to provide 40 acres of parkland in addition to the required 40 acres of commercial development to accompany each 240 acres of residential development. New construction requires a building permit signed by local government, but refusal to sign a permit must be justified on the basis of a zoning decision placed on an official zoning map and announced at least one round prior to the refusal to sign. Developers may sue for triple damages if they feel the refusal to sign is arbitrary and capricious. Such suits will be adjudicated by the game operator.

c). You should propose a level of flood protection which accurately reflects the interests of your constituency. Representatives of various wards should be sure they maintain contact with constituencies they represent.

d). You may enact any of the five levels of Flood Protection Programs described elsewhere provided that you meet the necessary costs and other requirements listed.

e). You may have 5 minutes at the end of each round (just before the election in even numbered rounds) to make public announcements regarding your programs, policies, zoning changes, tax rates, etc. You are advised to avoid letting this period turn into a public hearing or the 5 minutes allotted will be quickly used up. Any government or any group of 5 players may petition the game operator for a 10 minute public hearing once each round.

f). You may buy land from other players at the current market rate. If Level V Protection has been enacted you also have the power to condemn land in High Hazard Areas for subsequent purchase by local government.

g). You may assess each interest group an emergency levy of one point whenever a storm of hurricane severity or greater occurs to a community at less than a Level IV Protection Level. These funds are to be used to provide emergency assistance to those interest groups most severely hurt by the storm.

In order to accomplish your objectives and use these powers effectively it is suggested that you appoint one of your members to each major task, e.g., tax collector, building inspector, flood protection director, and a chairperson to call meetings and deal with the public. If you wish, you may "hire" persons from the community to perform some of these tasks, paying them 1 or 2 points per round.

DEVELOPMENT PERMIT

Location _____ Land Use _____

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved _____

DEVELOPMENT PERMIT

Location _____ Land Use _____

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved _____

DEVELOPMENT PERMIT

Location _____ Land Use _____

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved _____

DEVELOPMENT PERMIT

Location _____ Land Use _____

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved _____

DEVELOPMENT PERMIT

Location _____ Land Use _____

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved _____

DEVELOPMENT PERMIT

Location _____ Land Use _____

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved _____

DEVELOPMENT PERMIT

Location _____ Land Use _____

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved _____

DEVELOPMENT PERMIT

Location _____ Land Use _____

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved _____

DEVELOPMENT PERMIT

Location _____ Land Use _____

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved _____

DEVELOPMENT PERMIT

Location _____ Land Use _____

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved _____

ROLE DESCRIPTION - COMMUNITY BUSINESS (1-8

Players represent a specific interest group in
township. They may play their role independently or
forces with other players from the same district, the
group in other areas, or on any other basis that seems

As local business people you are intereste
community stability and growth. A larger and m
community will result in larger sales and service
most instances the community business group has strong
development. In addition to growth the business g
address issues of disaster preparedness and fl
balancing the cost of these programs against the costs
and the possible negative effects of restriction
development may occur. These restrictions are explain
OF FLOOD PROTECTION descriptions. Business interests
Wards I, II, and IV of Plano; in Wards I and II of Ri
Wards I,II, and III of Garland.

As local business people you may undertake new
the community. Vacant land may be purchased from t
and "developed" at a cost of 10 PAGAN Points per 40 a
cost of development of parkland or agricultural land
per 40 acre unit. Each developement undertaken, ho
"balanced" in terms of the mixtures of new land uses
the same municipality. A "balanced" mixture of land u
as six 40 acre units of residences and one 40 acre uni
industry. Local government may enact legislation re
of parks and open space to accompany each "balanced" d

No development may be undertaken without a buildn
by the appropriate local official. It is the respon
officials to insure that additional local requrements
have been met.

Newly developed residential units may not be oper
players. They must be "sold" to other playe
Residential interests in that ward or township. The p
whatever price can be agreed upon by the two gro
involved. Commercial or Industrial developments may
operated by the developer or may be sold to another gr
interests. No business property is considered in ope
Residential units developed with it have been "sold"
Residential interest groups. Parks and Open Spaces d
a package become the property of the local municpal
benefits going to the local Conservationists.

Each group of players will take fifteen minutes
the game to establish their roles. We ask you to be
to fill in the role you have been assigned with a var
and professional information which you will create. A
yourself to the other people in your group (ward)
describe:

1) your family;

2) your hobbies;

3) your specific profession (i.e., if you are a business interest, what type of business do you operate.); and

4) the roles you have played in the community (both governmental and non-governmental).

CURRENT STATUS - BUSINESS

City or County: ______ Date of Run _____

Ward or Township: ________ Name of Player _______

BASIS	Rd. 1 Status	Rd. 2	Rd. 3	Rd. 4
DEVELOPED ACRES	___	___	___	___
YIELD at 2Pt/40	___	___	___	___
STORM DAMAGE .	___%_	___%_	___%_	___%_
POINTS RECEIVED	___	___	___	___
NEW DEVELOPMENT	____	____	____	____
LOCATION . .	____	____	____	____
COST	____	____	____	____
POINTS SPENT .	____	____	____	____
FINAL BALANCE .	____	____	____	____
TOTAL DEV. ACRES	____	____	____	____

This is your score sheet which you will use to calculate your points during each round. Please note that points are the equivalent of currency for the purposes of this game.

The total number of points allocated to your role at the start of round one is indicated on line 4. This total will remain constant throughout each round regardless of the number of players assigned to each role.

Don't worry if you're a bit confused. This accounting system will be fully explained before the start of the game.

ROLE DESCRIPTION - LOW INCOME HOUSEHOLDS (1-8 Teams)

Players represent a specific interest group in each ward or township. They may play their role independently or they may combine forces with other players from the same district, the same interest group in other areas, or on any other basis that seems appropriate.

As low income households you are concerned about the impacts of community growth and flood damage on your portions of the community. At the same time flood protection proposals frequently emphasize restrictions on new construction and possible relocation and demolition of buildings in the flood plain. Because so much of your property is located in lowlying areas, you should be careful in supporting flood protection measures that may prevent you from developing further and which may even result in elimination of your holdings and your role in the game. It might be advisable to demand relocation assistance as the price for your support of various flood protection proposals. Low income households are located in Wards I,II,IV, and V of Plano; Ward I of Richardson; and Wards I, II, and III of Garland.

Each group of players will take fifteen minutes at the start of the game to establish their roles. We ask you to be imaginative and to fill in the role you have been assigned with a variety of personal and professional information which you will create. As you describe yourself to the other people in your group (ward) you will want to describe:

1) your family;

2) your hobbies;

3) your specific profession (i.e., if you are a business interest, what type of business do you operate.); and

4) the roles you have played in the community (both governmental and non-governmental).

This is your score sheet which you will use to calculate your points during each round. Please note that points are the equivalent of currency for the purposes of this game.

The total number of points allocated to your role at the start of round one is indicated on line 4. This total will remain constant throughout each round regardless of the number of players assigned to each role.

Don't worry if you're a bit confused. This accounting system will be fully explained before the start of the game.

CURRENT STATUS - LOW INCOME HOUSEHOLDS

City or County: ______ **Date of Run** _____

Ward or Township: ________ **Name of Player** _______

BASIS	Rd. 1 Status	Rd. 2	Rd. 3	Rd. 4
DEVELOPED ACRES	____	____	____	____
YIELD at 1Pt/40	____	____	____	____
STORM DAMAGE .	___%_	___%_	___%_	___%_
POINTS RECEIVED	____	____	____	____
NEW DEVELOPMENT	____	____	____	____
LOCATION . .	____	____	____	____
COST	____	____	____	____
POINTS SPENT .	____	____	____	____
FINAL BALANCE .	____	____	____	____
TOTAL DEV. ACRES	____	____	____	____

ROLE DESCRIPTION - MIDDLE INCOME HOUSEHOLDS (2-10 Teams)

Players represent a specific interest group in each ward or township. They may play their role independently or they may combine forces with other players from the same district, the same interest group in other areas, or on any other basis that seems appropriate.

As middle income households you are interested in maintaining the current status of the community. Issues of community growth and flood protection are important to you, but the costs associated with them may make them undesirable or dangerous to your position. Rapid community growth opens the door to "new elements" in the community which may threaten community stability and the relatively powerful position of the middle class. While increased levels of flood protection are desireable for both economic and humanitarian reasons, as major tax payers your interest group will pay a major share of the costs. The benefits to your interest group will be less than to some other groups since most of your property holdings are already located at higher elevations. Middle income households are located in every Ward in all three towns except Ward III of Garland.

Each group of players will take fifteen minutes at the start of the game to establish their roles. We ask you to be imaginative and to fill in the role you have been assigned with a variety of personal and professional information which you will create. As you describe yourself to the other people in your group (ward) you will want to describe:

1) your family;

2) your hobbies;

3) your specific profession (i.e., if you are a business interest, what type of business do you operate.); and

4) the roles you have played in the community (both governmental and non-governmental).

This is your score sheet which you will use to calculate your points during each round. Please note that points are the equivalent of currency for the purposes of this game.

The total number of points allocated to your role at the start of round one is indicated on line 4. This total will remain constant throughout each round regardless of the number of players assigned to each role.

Don't worry if you're a bit confused. This accounting system will be fully explained before the start of the game.

CURRENT STATUS - MIDDLE INCOME HOUSEHOLDS

City or County: ________ Date of Run _____

Ward or Township: ________ Name of Player ________

BASIS	Rd. 1 Status	Rd. 2	Rd. 3	Rd. 4
DEVELOPED ACRES	____	____	____	____
YIELD at 1Pt/40	____	____	____	____
STORM DAMAGE .	___%_	___%_	___%_	___%_
POINTS RECEIVED	____	____	____	____
NEW DEVELOPMENT	_____	_____	_____	_____
LOCATION . .	_____	_____	_____	_____
COST	_____	_____	_____	_____
POINTS SPENT .	_____	_____	_____	_____
FINAL BALANCE .	_____	_____	_____	_____
TOTAL DEV. ACRES	_____	_____	_____	_____

ROLE DESCRIPTION - HIGH INCOME HOUSEHOLDS (1-6 Teams)

Players represent a specific interest group in each ward or township. They may play their role independently or they may combine forces with other players from the same district, the same interest group in other areas, or on any other basis that seems appropriate.

As high income households you are interested in improving the overall quality of the community without being forced to pay higher taxes. Higher levels of flood protection significantly increase the construction cost for many of Hampton County's scenic but flood prone waterfront areas, and some individuals have suggested that these higher costs may discourage individuals other than high income players from building there. One the whole, you tend to oppose community growth which might challenge your status. Seeing flood protection measures as an inhibition to growth, you tend to favor higher levels of protection on both personal and intellectual grounds. High income residents are located in Wards II, III, and V of Plano; Wards I and II of Richardson; and Ward III of Garland.

Each group of players will take fifteen minutes at the start of the game to establish their roles. We ask you to be imaginative and to fill in the role you have been assigned with a variety of personal and professional information which you will create. As you describe yourself to the other people in your group (ward) you will want to describe:

1) your family;

2) your hobbies;

3) your specific profession (i.e., if you are a business interest, what type of business do you operate.); and

4) the roles you have played in the community (both governmental and non-governmental).

This is your score sheet which you will use to calculate your points during each round. Please note that points are the equivalent of currency for the purposes of this game.

The total number of points allocated to your role at the start of round one is indicated on line 4. This total will remain constant throughout each round regardless of the number of players assigned to each role.

Don't worry if you're a bit confused. This accounting system will be fully explained before the start of the game.

CURRENT STATUS - HIGH INCOME HOUSEHOLDS

City or County: _______ Date of Run _____

Ward or Township: ________ Name of Player _______

BASIS	Rd. 1 Status	Rd. 2	Rd. 3	Rd. 4
DEVELOPED ACRES	___	___	___	___
YIELD at 1Pt/40	___	___	___	___
STORM DAMAGE .	___%_	___%_	___%_	___%_
POINTS RECEIVED	___	___	___	___
NEW DEVELOPMENT	____	____	____	____
LOCATION . .	____	____	____	____
COST	____	____	____	____
POINTS SPENT .	____	____	____	____
FINAL BALANCE .	____	____	____	____
TOTAL DEV. ACRES	____	____	____	____

ROLE DESCRIPTION - AGRICULTURE (2-9 Teams)

Players represent a specific interest group in each ward or township. They may play their role independently or they may combine forces with other players from the same district, the same interest group in other areas, or on any other basis that seems appropriate.

As farmers you are interested in maintaining existing lands under cultivation and preventing the allocation of too much vacant or agricultural land for new development. In general you oppose growth as a threat to your own status but you are not opposed to selling some of your own farm land at a good profit to others looking for developable acreage. Taxes are burdensome, especially for farms located within the city limits. Your lands suffer very little from flood or wind damage except for occasional soil salinization due to high tides. As a result you tend to be indifferent to flood protection proposals except for the costs and taxes they require. Agricultural interests are located in every Ward of the three towns except Ward I of Plano.

Each group of players will take fifteen minutes at the start of the game to establish their roles. We ask you to be imaginative and to fill in the role you have been assigned with a variety of personal and professional information which you will create. As you describe yourself to the other people in your group (ward) you will want to describe:

1) your family;

2) your hobbies;

3) your specific profession (i.e., if you are a business interest, what type of business do you operate.); and

4) the roles you have played in the community (both governmental and non-governmental).

This is your score sheet which you will use to calculate your points during each round. Please note that points are the equivalent of currency for the purposes of this game.

The total number of points allocated to your role at the start of round one is indicated on line 4. This total will remain constant throughout each round regardless of the number of players assigned to each role.

Don't worry if you're a bit confused. This accounting system will be fully explained before the start of the game.

CURRENT STATUS - AGRICULTURE

City or County: ________ Date of Run _____

Ward or Township: ________ Name of Player _______

BASIS	Rd. 1 Status	Rd. 2	Rd. 3	Rd. 4
DEVELOPED ACRES	___	___	___	___
YIELD at 1Pt/640	___	___	___	___
STORM DAMAGE . .	__%	__%	__%	__%
POINTS RECEIVED	___	___	___	___
NEW DEVELOPMENT	____	____	____	____
LOCATION . .	____	____	____	____
COST . . .	____	____	____	____
POINTS SPENT . .	____	____	____	____
FINAL BALANCE .	____	____	____	____
TOTAL DEV. ACRES	____	____	____	____

ROLE DESCRIPTION - CONSERVATIONISTS (1-5 Teams)

Players represent a specific interest group in each ward or township. They may play their role independently or they may combine forces with other players from the same district, the same interest group in other areas, or on any other basis that seems appropriate.

Conservationists are concerned with the preservation of existing parks and playgrounds, the control of new development, and the maintenance of existing natural barriers and safeguards against flooding. While you favor the growth restraints contained in flood protection proposals, you fear that providing higher levels of protection and insurance may make some ecologically sensitive areas more available to new development. Since Conservationists are not actually property owners like other players in the game, your major activity will have to involve encouraging other players to behave more responsibly towards the environment. Such encouragement may be through persuasion or through legislation as well as through the direct exercise of political and financial power where you have only a small amount of clout.

One of your more promising strategies is to encourage more park developments in low lying and sensitive areas - paying development costs with public funds when possible but offering some of your own points in support as well. You may be able to convince your local government to pass legislation requiring that developers provide 40 acres of parks and open space as part of a legally required "balanced" development package necessary for approval of building permits. Other players probably do not realize that the number of points you receive is based upon the amount of land in parks and playgrounds; whether publicly or privately owned. Since existing parkland is publicly owned, Conservationists do not normally have to pay taxes to local government. Taxes must be paid, however, on income from privately owned parks. Conservationists are located in Wards III and V of Plano; in Ward II of Richardson; and in Wards II and III of Garland.

Each group of players will take fifteen minutes at the start of the game to establish their roles. We ask you to be imaginative and to fill in the role you have been assigned with a variety of personal and professional information which you will create. As you describe yourself to the other people in your group (ward) you will want to describe:

1) your family;

2) your hobbies;

3) your specific profession (i.e., if you are a business interest, what type of business do you operate.); and

4) the roles you have played in the community (both governmental and non-governmental).

CURRENT STATUS - CONSERVATIONISTS

City or County: ________ Date of Run ______

Ward or Township: _________ Name of Player ________

BASIS	Rd. 1 Status	Rd. 2	Rd. 3	Rd. 4
DEVELOPED ACRES	____	____	____	____
YIELD at 1Pt/40	____	____	____	____
STORM DAMAGE .	___%_	___%_	___%_	___%_
POINTS RECEIVED	____	____	____	____
NEW DEVELOPMENT	_____	_____	_____	_____
LOCATION . .	_____	_____	_____	_____
COST	_____	_____	_____	_____
POINTS SPENT .	_____	_____	_____	_____
FINAL BALANCE .	_____	_____	_____	_____
TOTAL DEV. ACRES	_____	_____	_____	_____

This is your score sheet which you will use to calculate your points during each round. Please note that points are the equivalent of currency for the purposes of this game.

The total number of points allocated to your role at the start of round one is indicated on line 4. This total will remain constant throughout each round regardless of the number of players assigned to each role.

Don't worry if you're a bit confused. This accounting system will be fully explained before the start of the game.

A normal round is 30 minutes long with twice as much time given in the first round to allow players to familiarize themselves with the mechanics of the game. The end of a round is indicated by a bell, whistle, or siren indicating that the flood season has arrived. There are six steps in each round with the first two controlled by the game operator. The next 3 are controlled by players themselves and may overlap to some degree. The last step allows local government 5 minutes to make public announcements and 5 minutes to elect or re-elect city officials in even numbered rounds.

STEP 1: WEATHER - The first step is to determine the amount of damage which occurred through storms and floods during the previous 5 years. Probability dice are rolled 5 times to determine the severity of the storms and the amount of damage inflicted in each year. The Flood Damage Table gives the probabilities of various levels of floods and the amount of damage suffered under various levels of protection. Damage is reported as a percentage loss to all properties in each ward. The magnitude of the loss is based upon the number of developed parcels lying within the floodplain. Loses may be decreased by providing higher protection levels for already existing properties, by preventing further developments in the floodplain, and by eliminating existing properties from the flood plain.

Rules

1. The game operator rolls probability dice 5 times (once for each year). The numbers on the dice will tell the game operator what level of flood is assumed to have hit the communities. Note that the probability of Light Floods occuring decreases by 1% for every 100 acres of floodplain which is developed upstream. Conversely, the probability of either Heavy or Severe Floods increases by the same amount. We assume that residents upstream are behaving exactly as residents in these three communities in terms of development locations.

STEP 2: POINTS - The success of each team is partially reflected by the number of points accumulated. Each team starts with a specific number of points and more are collected in successive rounds. These points may be used to purchase additional developments, build additional developments (Business teams only), pay taxes, rebuild damaged properties, and influence other players through contributions, gifts, etc. Points are earned by "owning" developed land. They may be lost through natural forces such as floods (the percentage loses determined in Step 1), or through poor financial planning.

Rules

1. Initial Points - Each interest group has been assigned ownership of a specific number of acres of developed land. The amount of land owned is given on line 2 of the Current Status Form provided with each role description. The location is described in the community description and is indicated on the community map. The type of development corresponds initially to the type of inerest group.

i) Residential interest groups receive one point for every 40 acres of undamaged residential land owned.

ii) Business interests receive two points for every 40 acres of undamaged Commercial of Industrial land uses owned.

iii) Conservationists receive one point for
acres of parks which exist in their
township, although this land is usually
the local municipality.

iv) Agriculture interests receive one point
640 acres of undamaged agricultural land o

v) Local officials receive points through
Local officials should be careful to no
the public points they control with th
owned by the interest groups they o
belonged to. Mixing the two is c
unethical.

2. Increasing Points - Additional points are
acquiring additional 40 acre parcels of land. T
acquired by purchasing them from one of the Busin
at a price negotiated between the buyer an
Points are paid out by the game accountant du
second step of play based upon transactions
during the previous round.

3. Decreasing Points - Players receive fewer p
property controlled by them is damaged by
hurricanes in Step 1. The decrease in points rec
proportional to the percentage damage received r
the nearest whole number of points. The percent
properties in each ward or township due to vario
of storms is given in TABLE IV, the Storm Dama
In the event of a storm of hurricane severity or
all interest groups in communities at less than a
of Protection must pay a one point emergency appr
to local government to help defray costs of
assistance.

4. Property Damage - Once damaged by a hurr
flood, a development is assumed to continue in
damaged condition yielding a lower return of poin
the owner decides to repair the property.
property may be repaired at a cost per 40 acre u
to the percentage of damage being repaired times
(the cost of original contruction).

5. Insurance - Property owners in communities en
the Flood Insurance Program are usually eligible
insurance payments providing 50% of the value
property damage sustained. Damaged property ow
file a claim form with the FEMA Officials who wil
or disapprove the claim and pay the appropriate
These points may be used for repairs or to
purchase of new properties.

6. Accounting - Players are expected to calculate the number of points they are entitled to receive each round on the Current Status Form accompanying each role description. The game accountant will review this information each round before paying out the PAGAN points which have been earned.

STEP 3: TAXES - Each city and the county is empowered to collect taxes at a level determined by local government but varying between 10% and 40% of the points earned. For the first round the tax rate is set at 20% for each of the three towns. At the end of the first round each government must announce the new tax rate for the next round. Taxes due are rounded up or down to the nearest whole integer of points received at Step II of the current round. Conservationists are exempt from paying taxes on their properties.

STEP 4: DEVELOPMENT - Players from Business Interest teams may develop additional groups of 40 acre parcels of land in any location provided they have a signed Development Permit from the Building Inspector of the jurisdiction where the development is to occur. Development may occur only on land currently owned by the Business Team.

Rules

1. A Business Team may purchase land from the operator or from other teams at whatever price can be agreed upon. All land sales must be recorded on the Current Status Form of both buyer and seller. The buyer can earn points on developed land only if he/she represents an interest group appropriate to the type of development involved. Existing developments may be demolished at a cost of 2 points per 40 acres of land to be cleared. Building permits are issued by local government officials when they have determined that the proposed development is in compliance with local zoning regulations, the general and local requirements for "balanced" combinations of development, and other development controls enacted locally including those required by approved hazard management programs.

2. A "balanced" combination of new developments is defined as six 40 acre parcels of residential development and one 40 acre parcel of commercial or industrial development. Local government may modify this "balanced" development requirement to require one additional 40 acre parcel of parks and open space.

3. The cost to develop a 40 acre parcel of land for most uses is ten points. Parks and Agricultural land costs 3 points per 40 acres. To reflect the existance of public services and roads, however, new development can only occur on parcels sharing at least one side with a previously developed parcel . The cost of development of

a parcel may be increased by 10-35% (the development surcharge) due to construction requirements imposed by the flood protection level currently in effect.

4. Additional points earned by newly developed land parcels is not paid out until Step 2 of the next round.

5. Players may combine points with other players in any combination that seems workable regardless of interest group designation or location. However, one player must be clearly designated as the party eligible to receive points from the accountant for any land developed through such combinations.

STEP 5: PROTECTION - Local government may enact one of the five hazard protection levels listed on Table II, the Levels of Flood Protection Table.

Rules

1. Local government may enact one of the five hazard protection levels, pass appropriate zoning legislation and hold those referendums which may be required to implement the new level.

2. Read the descriptions of the flood hazard protection levels carefully to determine the exact requirements for enactment. All costs and other requirements must be met or the protection level provided in the previous level continues by default.

3. Note that the costs and protections listed are cumulative from one level to the next. Only the difference between the new level and the previous level applies to either costs or benefits.

4. It is the local government's responsibility to obtain the necessary points to implement the flood protection program selected either through taxes, donations, or other sources.

STEP 6: ELECTION - As the last step in each round, each local government is allowed five minutes to address their citizens. This would normally consist of announcements of new levels of protection provided, new tax rates, new zoning restrictions and so on and might include appeals for reelection or passage of upcoming referenda.

Rules

1. Following any announcements referenda may be held and in even numbered rounds an election of local officials is held. Please note that any level of flood protection

beyond Level II requires a referendum. If the required referendum has not already been held as a part of Step Five above, it must be held at this time.

2. Also during this period, any group of five or more players may petition the local government and the game operator for a hearing if some pressing issue has not been adequately handled or discussed.

TABLE II. LEVELS OF FLOOD PROTECTION

NOTE: All costs and change figures are relative to Level I. Actual costs and changes are the difference between current level and new level to be enacted, e.g., in going from Level II to Level III the community must pay and additional 60 points; construction costs will increase by 5%; and property damages will be decreased by an additional 10%.

I NO PROTECTION: Development permitted with no effort to mitigate against potential flood damages. Community chooses not to enter or remain in N.F.I.P. No flood insurance is available to local property owners.

Number of Community Points Needed to Implement: 0
Property Damages Community-wide Reduced By: 0%
Construction Costs Increased By: 0%

REQUIRED ACTIONS: No enactment required -- default condition.

II MINIMAL PROTECTION: Community adopts minimum FIA regulations. No development allowed within the "floodway." New construction within the 100 year flood plain must be elevated to the 100 year flood height. Insurance payments will cover 75% of the losses for the first occurance only. No coverage is provided for subsequent damages.

Number of Community Points Needed to Implement: 40
Property Damages Community-wide Reduced By: 10%
Construction Costs Increased By: 10%

REQUIRED ACTIONS: Enactment by any town government.

III MEDIUM PROTECTION: Community adopts minimum NFIP requirements. New construction within the 100 year floodplain must be elevated one foot above 100 year flood levels . Existing structures which are not floodproofed are designated as in violation of the local building code. Develop evacuation/rescue plans. Insurance payments will cover 75% of the losses for each occurance.

Number of Community Points Needed to Implement: 100
Property Damages Community-wide Reduced By: 20%
Construction Costs Increased By: 15%

REQUIRED ACTIONS: Community referendum needed to adopt new building code. Enactment by town government required (if referendum passes and if required points are available).

TABLE III. FLOOD DAMAGE TABLE

Percent Damage by Location, Protection Level, and Flood Severity

PROTECTION LEVEL	Plano Wards					Richardson Wards		Garland Wards		
	I	II	III	IV	V	I	II	I	II	III
LIGHT FLOODS. Prob. = 0.89, No's. = 12-100										
I	0	0	0	0	20	20	10	60	50	20
II	0	0	0	0	10	10	0	0	40	10
III	0	0	0	0	0	0	0	0	30	0
IV	0	0	0	0	0	0	0	0	20	0
V	0	0	0	0	0	0	0	0	10	0
HEAVY FLOODS. Prob. = 0.10, No's. = 2-11										
I	0	20	10	20	40	40	30	80	70	40
II	0	10	0	10	30	30	20	70	60	30
III	0	0	0	0	20	20	10	60	50	20
IV	0	0	0	0	10	10	0	50	40	10
V	0	0	0	0	0	0	0	40	30	0
SEVERE FLOODS. Prob. = 0.01, No. = 1										
I	10	40	30	40	60	60	50	100	90	60
II	0	30	20	30	50	50	40	90	80	50
III	0	20	10	20	40	40	30	80	70	40
IV	0	10	0	10	30	30	20	70	60	30
V	0	0	0	0	20	20	10	60	50	20

OPERATOR'S INSTRUCTIONS

NUMBER OF PLAYERS: PAGAN-Coastal has been designed to accomodate a large variety of players. Some approximate knowledge of the number of players to be accomodated must be available before the game, however, in order to decide which of the political jurisdictions are to be employed in the game run. In general, two or even three players are preferred in each role in order to force players to discuss their decisions among themselves, thus improving the information flow and learning potential of the game. Having at least two players in each role also allows for one to serve as a public official while the other can stay "at home" taking care of the special interests of the role.

The total game consists of 42 interest groups or roles plus 12 elected officials in the 3 jurisdictions and a team of FEMA officials. For a small group of players, the Town of Richardson alone could be played involving 10 interest groups plus 2 elected officials and the FEMA officials. Ideally this would involve 2 players per interest group with three to be elected to public office plus 1 or 2 persons assigned to represent FEMA for a total of 23-24 players. As few as twelve players could be accomodated if 1 were appointed to each interest group, the town government, and FEMA.

Other combinations of 2-3 persons per team plus the use of larger jurisdictions and combinations of jurisdictions provides a considerable range of ways in which varying numbers of players may be accomodated in varying arrangements of the game. The table below summarizes these possibilities.

	NUMBER OF PLAYERS		
	OPTIMUM	MINIMUM	MAXIMUM
RICHARDSON ONLY	24	12	35
GARLAND ONLY	33	16	48
PLANO ONLY	41	19	59
RICHARDSON AND GARLAND	57	28	83
RICHARDSON AND PLANO	65	31	94
GARLAND AND PLANO	74	35	107
ALL THREE TOWNS	98	47	142

ROOM ARRANGEMENTS: A separate table for each ward or township plus one for each governing body and the FEMA officials should be arranged in a single large room in a pattern roughly conforming to their geographic distribution on the county map. Enough room must be provided to allow players relatively easy access to each other's tables for purposes of bargaining and discussion. The table for the elected officials should be located near the center of their respective wards and townships while the table for the game operator and accountants should be located off to the side, preferably near a blackboard or bulletin board.

If a single large room is not available, each jurisdiction played could be located in a separate smaller room. Provison for movement between rooms must be made, however, and a sngle larger meeting area where all players can come together for "community meetings" and the debrifing at the end of the game is desireable. Separate rooms for each jurisdiction usually results in lower levels of communication and cooperation between them, a situation it may be desireable to simulate in order to make plaers struggle with ways to oercome these problems.

Each table and/or room should be clearly labelled with the name of the jurisdiction an ward or township seated there.

EQUIPMENT: aside from paper and pencils, the only special equipment required by the game is some method of generating random numbers from 1 to 100 and some type of overlay map of the county large enough and displayed prominently so that players may refer to it in their discussions and so that changes in land uses may be recorded upon it.

Probability dice consisting of a pair of icosohedrons can usually be purchased in local hobby shops. Before casting them for the players be sure they understand which die represents the tens digits and which the units digits. Usually 00 is taken as 100. If probability dice are not readily available, a table of random numbers may be found in the back of most statistics texts. another possibility is to put 20 slips of paper into a paper bag. Two slips each should be numbered from 0 to 9. drawing two slips of paper from the bag then generates two numbers with the ist number designated as the tens digit and the second number as the units digit.

The large map of the county may be sketched fairly roughly since its major purpose is simply as a focus for discussion and to provide some location where major changes in land uses can be indicated. An overlay of acetate or other erasable transparency will allow the map to be readily changed with grease pencils.

PRIOR TO PLAY: If possible, several days before the game all players should receive a copy of the Introduction, the Overview, the Steps of Play, a City or County Map, an appropriate Community Description including Tables I and II, the Levels of Flood Protection Table (Table III), and the Storm Damage Table (Table IV). Specific role descriptions should usually not be provided beforehand in order to ensure that each role is filled at the time of play by assigning them only at the actual start of the game.

It is preferable to assign players to their roles first and to then ask them to choose their elected representatives from among themselves at the rate of one representative from each ward to serve on the City Council plus one representative from each city and each township to serve on the County Board of Supervisors. In this way they tend to have a clearer image of the fact that they are representing a particular constituency. If necessary, however, players may be assigned directly to local government immediately at the beginning of play. In any event, role descriptions for local government including Building Permit Forms should be placed on the appropriate tables prior to the start of the game.

Enough copies of each role description to provide one for each player should be reproduced before the game. Extra copies of the Steps of Play, Storm Damage Table, Flood Protection Table, and the Community Descriptions should also be reproduced prior to play since many of the players will fail to bring their copies with them to the actual game run.

Fill out a Current Status Form for each role being played and place several copies on the apropriate tables just before play begins or have an assistant pass these forms out to the apropriate interest groups while you are making your introductory remarks. Acreage figures and points for each interest group are given in the Interest Group Points Allocation Table (Table V) presented at the end of the Operator's Instructions section.

A single experiened operator can probably handle a game involving only one municipality. If inexperienced, an accountant assistant should be used for even a small game run. If two or more jurisdictions are being used in the same game, two or even three accountant assistants should be used to assist the game operator.

DURING PLAY - Only a very brief 5-10 minute introduction to the game should be provided prior to beginning the first round. Players usually have many questions to ask prior to play but answering them before the game often creates more confusion than help. Most questions are much better answered during and immediately after the first round of play. The introduction should consist of quickly pointing out the locations of the various interest groups and governments, the Steps of Play, the Storm Damage Table, the Levels of Flood Protection, the maps and the Current Status Form accompanying each of the role descriptions. Players should be asked to locate their ward and their land developments on the land use map and to note the corresponding acreage figures given on the Current Status form.

Players should be informed that the number of points they are about to receive are based upon the number of acres of land they own in their ward or township less a percentage equal to the amount of storm damage received in each of the last five years. The amount of land owned may be increased by the players following the procedures outlined in the Development Step of Play.

Prior to the first step of play, local officials must be elected if you have not already appointed them. Allow plaers a few minutes to discuss this among themselves and then call for the election. Remind them that the position is only held for two rounds and that they will have a chance to change their choices at the end of the next round. Some forcefulness may be called for here in order to get the election carried out quickly.

Immediately following the election and the movement of the elected players to the tables provided for their respective goernments, announce the beginning of the game with the arrival of the hurricane season. Explain the meaning and use of the dice and roll them the first time. Then refer players to the Storm Damage Table and show them how the severity of the storm and the associated damage levels are determined by the numbers rolled by the dice. Roll the dice four more times to represent the remaining four years and announce the total impact of storms over the previous five years in terms of the total amunt of damage accumulated. This varies by ward or townsip but pointing out one or two such cases and summing the percentages is usually enough to make players understand how the procedure works.

Players should then be instructed to fill out their Current Status Forms and go to the accountant to receive their initial PAGAN Points, thus initiating the second step of play. While this is going on, the operator sculd circulate among individual tables to help players to determine their total damages and complete their Current Status Forms. Some confuson can be expected here during the first round but by the second round this step should be quite straightfoward. While individual teams are obtaining their points, turn to the FEMA officials and warn them that they should be encouraging insured teams to make insurance claims for damages sustained. Players should be informed that they may be eligible for insurance and that they should check the rules under the second step of play as well as the FEMA officials to determine their eligibility.

Gradually most players will have worked themselves through the second step of the round. Points will have been collected and insurance forms filled out and possibly approved. FEMA officials will need some PAGAN Points to meet the claims filed. The operator should provide these carefully in order to make the FEMA officials a little cautious in approving claims. In general, the operator should provide just enough funds to meet all legitimate claims but should give the clear impression that funds will not be provided for poorly handled or spurious claims. A careful review of the claims filed in the first round is usually sufficient to make FEMA officials behave responsibly in later rounds.

While all this is happening, local government should be meeting and appointing its own officers as suggested in their role descriptions. Urge them to appoint the tax collector right away so that you can help him/her begin to collect taxes at the first round rate of 20% as soon as individual teams have collected their points from the accountant. This gets the third step of play under way and completed while steps 1 and 2 are still underway for some of the players

The initiation of step 4 may require a little more deliberate and separate discussion, although a few teams may have already moved into this step while you have been helping others through the earlier steps. At this point, the Business Teams in particular should be advised as to how they may undertake development, purchasing land from the operator and putting together enough funds to make up a "balanced" development package. It is likely that several Business Teams may have to combine resources in order to gain enough points for both land purchase and contruction. It may be that only part of the land purchases may be accomplished in the first round and no development will occur.

The operator is cautioned to exercise some care in allowing Busines Teams to buy land. Development as an option in the game is desireable and necessary for realism in competition with flood proction issues. Some players may become totally engrossed in development, however, and prevent the entire community from considering flood protection programs. Some competition for attention and resources is desireable but the operator can and should limit such efforts by refusing to sell enough land or making the prices for land high enough to inhibit too much development. it may take two or three rounds before any developer or combination of developers will have enough funds available to put a complete development package together.

While all this is going on, many players including local government should be considering the possibility of enacting higher levels of flood protection, i.e., undertaking step 5. The operator should be ready to help explain the meaning of the various levels and to show how the amount of protection provided decreases the amount of damage shown in the Storm Damage Table. Local Government officials should be cautioned to make sure they have enough funds available to pay for the level of protection enacted and that they are aware of any referendums which may be required.

Finally, the elected spokesperson for local government should be coached to prepare a statement and agenda for step 6. Announcements must be made, referenda held, and perhaps a brief public hearing allowed for. Following completion of the public hearing the operator should step in to answer questions. After some discussion of the events in round one, the operator should point out that the players now know most of the rules and that the next round can and should proceed much more quickly. The operator then pulls out the probability dice thereby announcing the start of the next round and the arrival of the hurricane season.

The second and third rounds should proceed much more quickly and with less and less need for the intervention of the operator. Players should be encouraged to get into side discussions on the relative merits of various levels of flood protection and the ways in which it effects the community. As the third round draws to a close, it is probably time to consider breaking off the actual play of the game and leading the participants into a more general discussion of what has happened during the game.

DEBRIEFING - Individual style dictates the manner in which the debriefing is to be held but several steps of discussion often help to lead the players out of the game and back into issues to be addressed in the real world.

Some time is needed in the beginning of every debriefing to allow players to let off steam. Ask one or two of the players to describe what they were trying to accomplish and how well they succeeded. If several jurisdictions are being played, asking for a report from each and drawing comparisons among them may be helpful.

After a short time, however, players should be directed away from happenings in the game towards broader questions regarding the significance of what happened to their interest groups. Did their flood protection program work? What kinds of problems were encountered in trying to get higher levels of protection passed? Were these problems realistic? Which groups worked for flood protection programs and which ones were opposed? Why did they take these stands?

Fairly quickly the discussion will take on its own character and lead players away from the game towards much broader discussions of flood protection issues and philosophies. At some point along here the game and the debriefing ends and the conference picks up again. In closing, thank the players for their participation. Then go buy yourself and your assistants a couple of good stiff drinks.

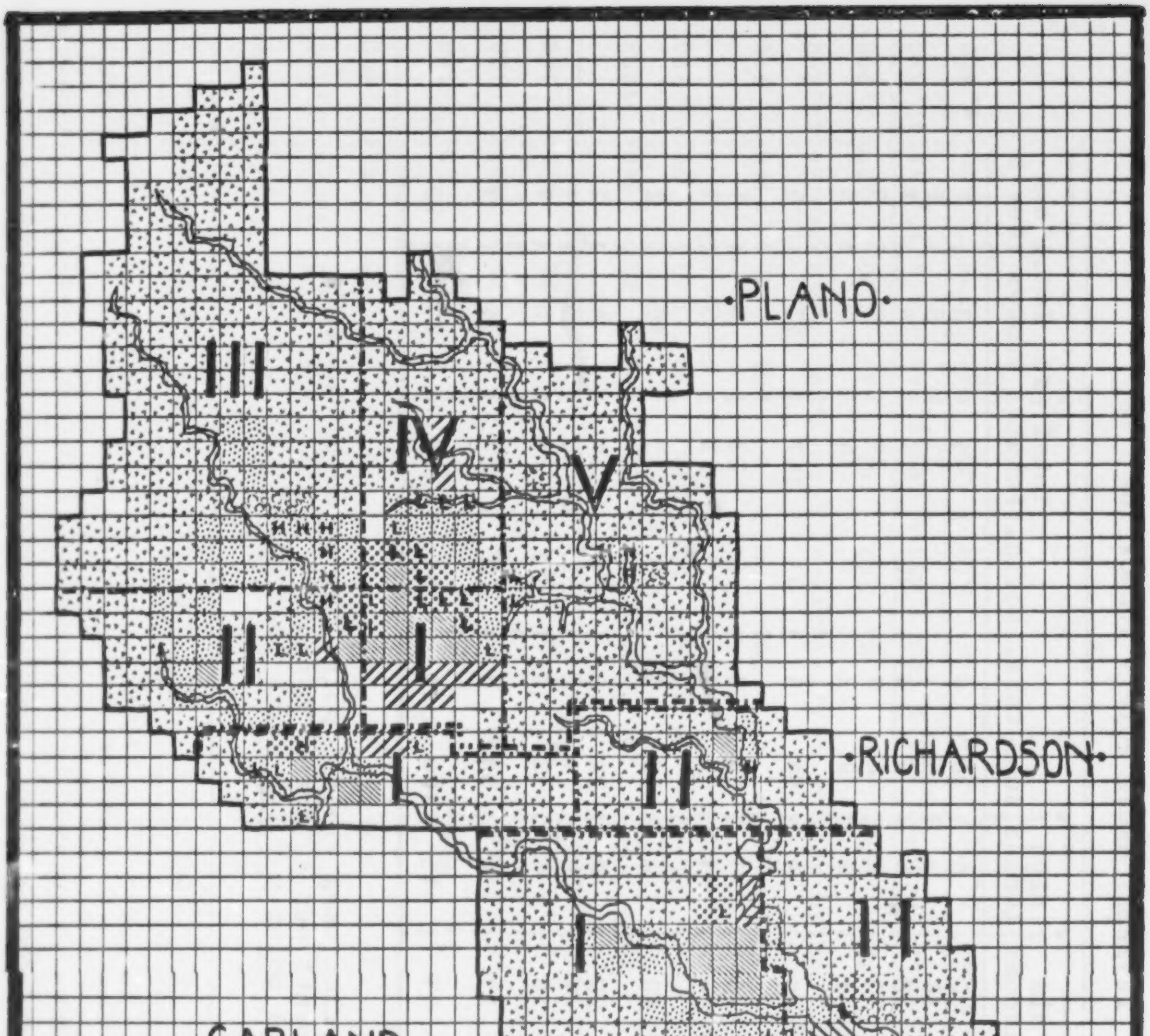
TABLE IV. Total Acres of Land Use by Type, "Owner," and Location - Three Towns

Use	Owner	Plano Wards					.	Richardson Wards		.	Garland Wards			.	GRAND TOTAL
		I	II	III	IV	V	TOTAL	I	II	TOTAL	I	II	III	TOTAL	.
Low . .	Lo Inc	40	120	0	160	80	400	160	0	160	40	80	120	240	800
Density	Med Inc	80	680	720	320	40	1,840	200	160	360	760	280	0	1,040	3,240
Resid.	Hi Inc	0	40	200	0	120	360	0	40	40	0	0	40	40	440
High .	Lo Inc	240	40	0	120	0	400	0	0	0	40	0	0	40	440
Density	Med Inc	0	40	0	120	0	160	40	0	40	0	0	120	120	320
Resid.	Hi Inc	0	0	0	0	0	0	40	0	40	0	0	120	120	160
Comm. .	Bus. .	360	80	0	40	0	480	120	40	160	400	0	40	440	1080
Ind. .	Bus. .	360	40	0	120	0	520	80	0	80	80	80	160	320	920
Parks .	Cons. .	0	0	120	0	80	200	0	80	80	0	80	80	160	440
Agric .	Agric .	0	1,280	6,400	1,920	5,120	14,720	1,280	1,920	3,200	3,840	3,200	7,680	14,720	32,640
Vacant	Oper. .	440	400	440	80	40	1,400	280	0	280	160	40	120	320	2,000
TOTAL .	....	1,520	2,720	7,880	2,880	2,160	20,480	2,200	2,240	4,440	5,440	3,840	8,360	17,640	42,560
IN FLOO	D PLAIN	0	520	1,360	1,080	2,160	5,120	240	200	440	960	760	1,720	3,400	8,960

TABLE V. INTEREST GROUP POINTS ALLOCATION

Town Ward	Low Income	Mid Income	High Income	Bus.	Cons.	Agric.	Total Points	No. Int. Groups	Town Gov't
Plano-Town-Ward-I	7	2	0	36	0	0	45	3	1
II	4	18	1	6	0	2	31	5	1
III	0	18	5	0	3	10	36	4	1
IV	7	11	0	8	0	3	29	4	1
V	2	1	3	0	2	8	16	5	1
SubTotal	20	50	9	50	5	23	157	17	5
Richardson-Ward-I	4	6	1	10	0	2	23	5	1
II	0	4	1	2	2	3	12	5	1
Subtotal	4	10	2	12	2	5	35	10	2
Garland-Town-Ward-I	2	22	0	24	0	6	54	4	1
II	2	9	0	4	2	5	22	5	1
III	3	0	4	10	2	12	31	5	1
Subtotal	7	31	4	38	4	23	107	14	3
TOTAL	31	91	15	100	11	51	299	41	12

Residential and Conservation uses yield 1 point per 40 acres "owned".
Business uses yield 2 points per 40 acres "owned".
Agricultural uses yield 1 point per 640 acres "owned".


PLANO
III
IV
V
II
I
RICHARDSON
I
II
I
II
GARLAND
III
Rowlett Creek Basin
Low Density Residential
Recreation
High Density Residential
Agriculture
Commercial
Rural/Vacant
Industrial
Flood Plain
0
1"
1 Mile
2"
2 Miles
3"
3 Miles
L Low Income
Middle Income
H High Income

1
PAGAN
point

1
PAGAN
point

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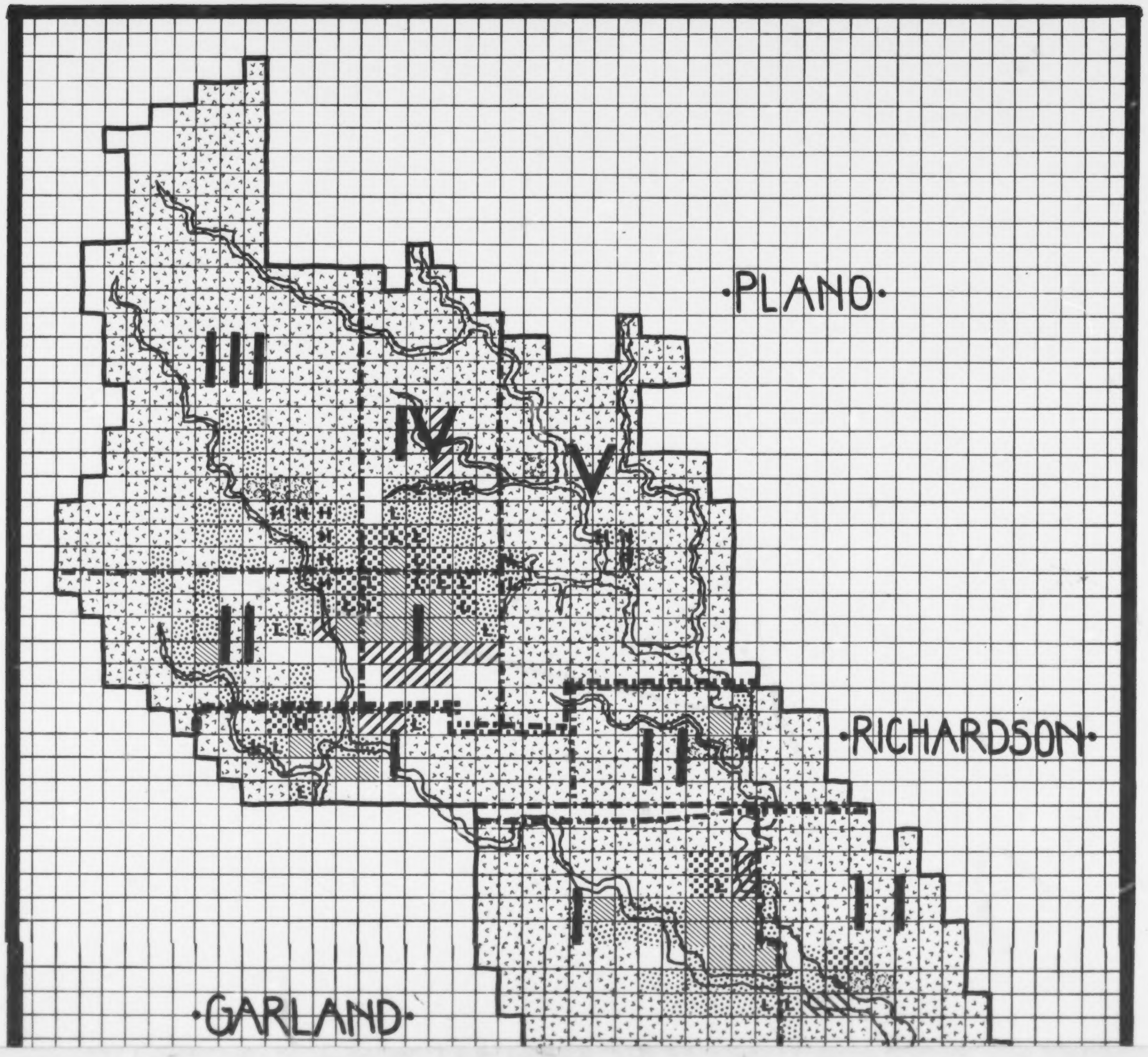
PAGAN
GAME
BOARD

(RIVERINE)


PLANO
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III
IV
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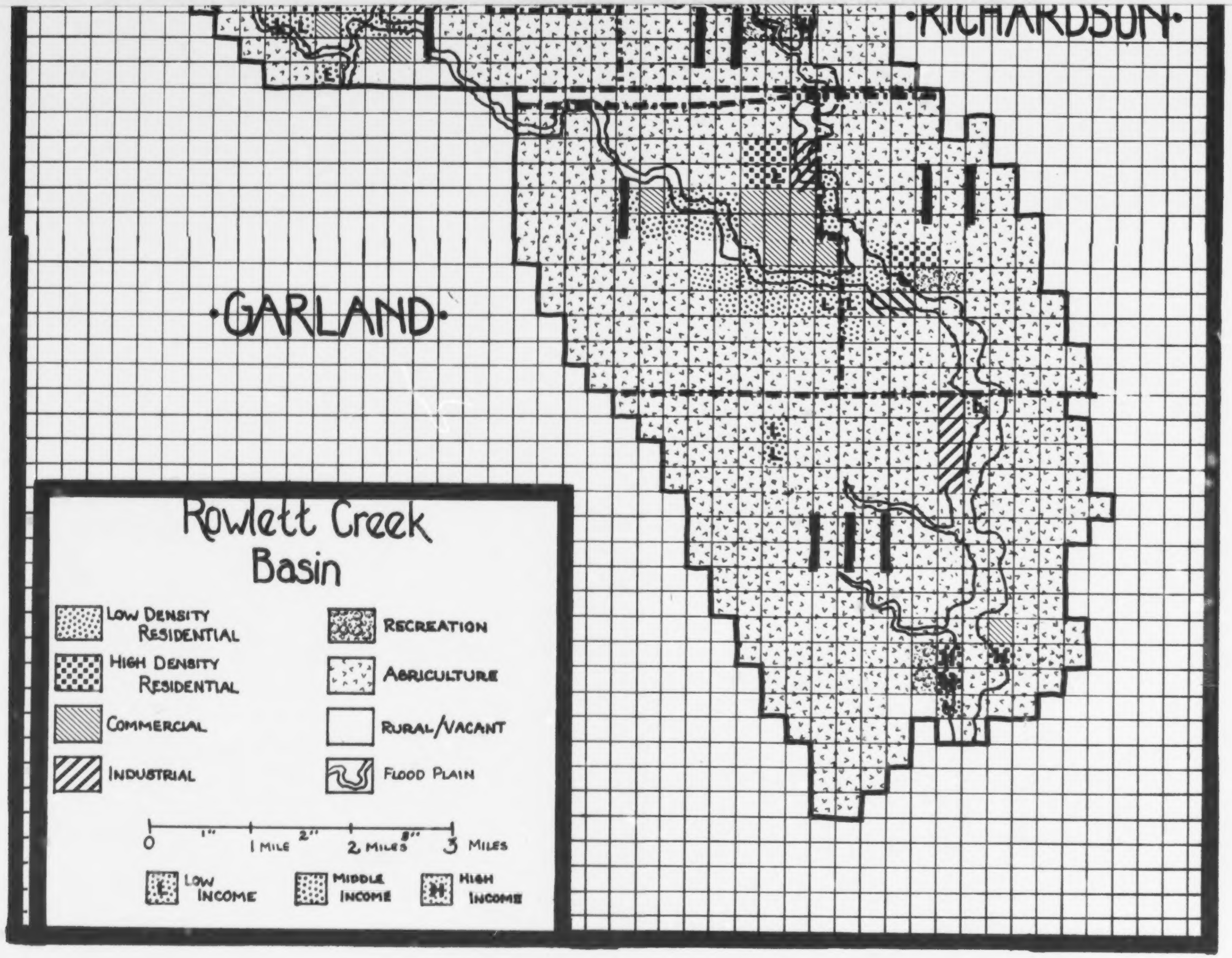
II
I
II
I
II


·RICHARDSON·
·GARLAND·
Rowlett Creek Basin
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Agriculture
Rural/Vacant
Flood Plain
0
1"
1 Mile
2"
2 Miles
3"
3 Miles
Low Income
Middle Income
High Income

APPENDIX E

SIMULATION EXERCISE (PAGAN)

COASTAL

PLANNING for ACTS of GOD AND NATURE

PAGAN - Coastal

by

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OPERATING CHARACTERISTICS: PAGAN is designed to be played in about three hours including debriefing. The first round should take about one hour allowing ten minutes for each of the six steps of play. Later rounds should take about one-half hour each with 5 minutes for each step. The game can theoretically be run with as few as nine or as many as 126 persons by assigning up to 3 persons to each of the 41 geographically separated interest groups and to the 14 elected governmental positions. A separate table is needed for each ward or township plus each governing body plus one for the game operator and accountant. For a full run of all three jurisdictions and all wards and townships this would mean a total of 16 well separated tables in one very large room or in 3 or 4 separate rooms. rooms arranged spatially in a pattern approximating their geographic locations. Except for a pair of probability dice or their equivalent, all materials required for the game are provided in this manual.

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AN INTRODUCTION TO SIMULATION/GAMES

Simulation/games have been widely used in many disciplines to represent the complexities of multiple decisions under conditions of uncertainty. They have been used in military training excercises for over 150 years, in business management training for over thirty years, and in urban planning for over fifteen years. Through deliberate abstraction of a problem to it's basic elements, simulation/games allow participants of widely varying backgrounds to gain an overview of the problem being considered which can clarify and broaden their perspective when they are faced with similar though more detailed issues in the "real world." In addition to providing an overview, games also collapse time, thereby enabling a player to see the effects of decisions over many years in the course of a few hours of play.

Most simulation/games consist of three principle elements plus a variety of artifacts in written, mathematic, graphic, or physical form whose purpose is to record or convey information to players. The first principle element is the Scenario - the data and description of the time and place being represented in the game. The second element is the Roles - the primary actors in the game including descriptions of who they are, what their relative interests and strategies may be, and what their status is at the beginning of the game. The third element is some form of Accounting System - which records the decisions of players and determines what impact they have on the scenario and the roles. The accounting system must also feed some or all of this information back to the players on a regular basis as a guide to future decision making.

Most games are played over a series of time periods called "rounds" approximating some amount of time in the "real world" ranging from hours to decades. Similar activities usually take place each round with players making more rapid and sophisticated decisions in later rounds, as they become more familiar with the game and it's rules. The first round is often very confusing since players must learn to understand both the mechanics of the game and the factors influencing their decisions. In later rounds confusion over rules and game mechanics dissipates while the complexity of decisions may increase due to the increasing sophistication of the players plus the increasing effect of decisions accumulated from previous rounds.

Simulation/games can be reasonably accurate representations of the "real world" situations they depict but their outcomes should not be interpreted as predictive of how real events are likely to turn out. Simulation/games are merely representations of how various components interact. The assumptions of the persons designing them plus the decisions of the players themselves strongly effect the outcome. Such an outcome represents at best only one of many possible worlds which could emerge in the "real world" system being modeled. Thus all simulation models, regardless of their complexity can never be anything more than instructional devices allowing us to observe and experiment with possible futures.

OVERVIEW

PURPOSE: PAGAN attempts to provide an understanding of the conflicting interests involved in developing a flood hazard management program. Based on case study materials, the game requires players to try to resolve the conflict between advancing their own interests through acquiring more property and points (currency) and protecting their own and the community's interests through providing an adequate level of flood protection.

GAME STEPS: The game is played in successive rounds, each of which consists of six steps that take place over a time period representing five years. During each round, players are exposed to varying size storms or hurricanes and must consider the resulting costs of disasters that arise through their own activities, the activities of their neighbors and Acts of God And Nature. The steps are:

1) Weather -- Establish the amount of damage which has occurred through storms, hurricanes and floods during the previous five years;

2) Points-- Establish the points (currency) earned by each player;

3) Taxes -- Local governments assess and collect taxes;

4) Development -- Individual players develop or purchase additional units of land;

5) Protection -- Local government establishes the desired level of flood protection;

6) Local Government Action -- Referendums, elections, and public meetings to establish future strategies to complete passage of floodplain ordinances, and to elect new local officials if necessary.

SCENARIO: The action takes place in Hampton County and it's two cities of Oakton and Hamilton Beach. The county's population is around 103,000 with 48,000 living in Oakton and another 15,000 within the seaboard resort community of Hamilton Beach. The entire area is subject to periodic damage from storm tides and winds at known probabilities. The degree of damage sustained is determined by the severity of the storm, the type of development, and the level of hazard protection provided. Players may influence the level of hazard protection and the degree of community development by investing points towards either or both of these options. Points received in later rounds depend upon how well the interests of each team were met in earlier rounds.

ROLES: The two cities and the county are made up of wards or townships, each of which in turn contains a number of interest groups represented by assigned game roles. Interest groups vary among the different areas but generally consist of Low Income Households, Middle Income Households, Upper Income Households, Local Business, Local Conservationists, Agriculture, Local Government elected by the players in each ward or township, and representatives of the Federal Emergency Management Agency (FEMA). Each ward or township is seated at a separate table with the three communities located in different parts of the room or in separate rooms. The central task facing each community individually and as a group is to reach an agreement among diverse interests on the type of growth desired and the degree of hazard protection to be provided. Cooperation among wards, interest groups, and communities is encouraged but is hampered by problems of communication, differing interests and differing perceptions of the problems faced.

ACCOUNTS: The basic variables in PAGAN are 1) the amount of land of a given type controlled by each player; 2) the amount of damage that land receives each round; 3) the number of points each player receives as a result of land holdings and damages; 4) the tax rate set by local governments; and 5) the level of damage protection provided. Both players and the game operator keep records on the levels of these five variables during play and their figures are reconciled each round when PAGAN Points are paid out.

HAMPTON COUNTY DESCRIPTION

Hampton is a coastal county located on a peninsula between the Atlantic Ocean and the Coral River. It's terrain consists primarily of sandy ridges, sandy loam plateaus, and swampy areas on typical Carolina bays. Land elevations range from sea level to as much as seventy five feet, with a series of dunes and bluffs extending along most of the county's Atlantic coastline. A narrow band of barrier islands extends along the coastline, shielding the intercoastal waterway from storm and wave effects during all but the most severe storms.

The county contains only two cities, Oakton which is located on the bluffs overlooking the Coral River and Hamilton Beach which occupies one of the larger barrier islands and is primarily a resort community. The population of Hampton County was 80,000 in 1970 and 103,000 in 1980. Less than 50% of this population (48,000) lives in Oakton with another 15,000 (25,000 summer) persons in Hamilton Beach and about 6,000 persons living in six small outcounty villages. The remainder of the County's population lives in low density residential areas clustered primarily on or near shorelines and on farms in the county's agricultural areas.

Since 1970 population has increased at a steady rate of 2-3% per year, with much of the new development occuring in rural areas and along the coastlines. Currently about 11% of the county's total land area is developed for urban or industrial uses, about 21% is under agricultural cultivation, and the remainder consists of forest, water, wetlands, and vacant land. The climate of Hampton county ranges from hot and humid in the summer to cool in winter. Mean annual precipitation is 54 inches while the average wind velocity is 9 m.p.h.

Hampton county is subjected to occasional storms and hurricanes and their associated wind and flood damage. During extreme tides and storm surges most of the barrier islands and beaches are overtopped to such an extent that ocean waves pass directly into the intercoastal waterway, effecting mainland shores, estuaries, and coastal streams. Storm surges and high tides also move up the Coral River and it's tributaries, effecting the city of Oakton and it's environs. Observed high water marks and tide gauge records indicate that ocean tides higher than five feet have occured six times since 1954. A hurricane (winds greater than 73 mph) can be expected to strike Hampton county one year in twenty while a great hurricane (winds greater than 125 mph) can be expected to strike one year in fifty. Storm surges and floods rising well above the 10 foot contour line can be expected one year in a hundred. Floods above the 20 foot contour line have never occured and are considered impossible locally due to the estuarine character of the area.

Hampton county has recently entered the Regular National Flood Insurance Program at a minimum level of protection (Level II, Table III). This means that land owners will be reimbursed for 50% of the damage incurred from storms, hurricanes, and floods. This insurance will not cover damages from a second occurence unless the community increases its level of protection prior to the next storm.

A recent land use analysis which focused on development suitability of county lands found that nearly 50% of Hampton county is unsuitable for other than agricultural development, and that much of the remainder should be developed only with extreme caution. Recently adopted land use regulations have begun to implement this study's findings, but resistance on the part of several County Commissioners who feel that such regulations will stifle needed economic growth within the county has prevented further regulation of land uses. The fact that the land use study singled out shoreline properties as being most hazardous has caused particular problems, since much of Hampton County's recent growth has involved the construction of low density residences and high rise condominiums on these types of sites.

Because of this new development along the river banks and coastlines of Hampton county the level of damage from another major hurricane like that of 1952 is expected to increase substantially. Many of the residences and businesses which were heavily damaged or destroyed in 1952 have been rebuilt in the same places, and the large numbers of newly developed residences within the five to twenty foot contours pose a constant danger of massive damage and dislocation of county residents. Some beach nourishment and refurbishment programs are currently in effect using federal monies, but Hampton county is essentially without any current hazard management or flood protection programs at this time beyond meeting the minimum NFIP requirements.

In addition to Oakton and Hamilton Beach, the county is made up of the four rural townships of Anne, Beauregard, Charles, and Desmond. Each township and each city elects one representative to the County Commission for a two round period resulting in a total of six County Commissioners setting county policy.

Anne Township lies west of the Coral River and its northern fork and is made up largely of agricultural holdings with a few residential areas above the twenty foot contour. Its population is made up of agricultural interest groups plus low and middle income interest groups. Due to their inland position plus the lack of any development other than agriculture below the 20 foot contour, residents have been totally indifferent to previous local efforts at flood control. (Low and Mid Income, Agriculture, and Conservationists)

Beauregard Township lies north of Oakton and the North Coral River and west of Highway 21. The area contains over 40% of the agricultural lands in the county together with three moderate sized villages containing some commercial and industrial developments. Most developed areas lie above the twenty foot contour although the Northernmost village lies just above the ten foot contour close to the banks of the North Coral River. Its population is made up of low and middle income interest groups, commercial interests, and agricultural interests. As the township most likely to profit from continued industrial and commercial expansion of the county, most residents of

Beauregard Township favor continued growth and development while their major concern for flood hazard management programs has been to maintain a strong positive image of the county in order to impress potential investors. (Low and Mid Income, Agriculture, Business and Conservationists)

Charles Township occupies the northeastern coastal part of the county , excluding the City of Hamilton Beach. The area is sparsely settled except for a fishing village in the north and a small group of middle class retirees on Wilton Island. The area is frequently severely damaged by ocean storms. Hurricane Agness resulted in total loss of almost all structures in the township but caused no deaths. Both the low and middle income interest groups actively oppose most flood hazard programs as a threat to their livelihood and way of life as well as another example of Washington Socialism. Conservationists among the middle class residents of Wilton Island favor some form of government intervention, however, in order to prevent unbridled speculation and despoilation of beach front properties. (Low and Mid Income, and Conservationists)

Desmond Township lies south of Oakton along the coastal and estuarine marsh area. Lower lying parts of the township are subject to frequent flooding and local residents have been vociferous in their demands for better flood control and lower flood insurance premiums. Particularly hard hit have been the middle class residents along the Coral River flats in the south and on Duffy's Island just offshore. A recently completed high rise apartment project was placed just above the ten foot contour in order to placate these concerns. The fifteen story building is guaranteed to be completely floodproof and commands a striking view of the river mouth and the Atlantic Ocean. Lower Income residents live in the 1950's subdivision constructed on high ground just south of Oakton and work in industries and commercial establishments located in Oakton. The middle class in the other two localities are made up of a combination of retired persons and middle management personnel from Oakton industries. Although politically conservative they are strong opponents of continued growth. They support the local conservationists to a limited extent since both groups tend to favor limiting growth and greater flood protection. (Low and Mid Income and Conservationists)

TABLE I. COMMUNITY LAND USE IN ACRES

Land Use Type	Oakton	Hamilton Beach	Hampton County
Low density residential	2600	520	7320
High density residential	480	120	880
Commercial	480	80	560
Industrial	480	40	720
Parks and playgrounds .	160	160	960
Agriculture	1280	0	21760
Vacant	3000	1120	73400
Total	8500	2040	105600
total square miles . . .	13.28	3.19	165.0

TABLE IIA. INTEREST GROUP LAND OWNERSHIP (Acres)

Interest Group	Hampton County Towns			
	A	B	C	D
Lo Inc.	160	640	960	480
Mid Inc.	160	960	320	800
Hi Inc.	0	0	0	0
Bus. . .	0	200	0	0
Conser.	160	120	120	240
Agric. .	11520	8960	0	0
TOTAL .	19680	10880	1400	1520

OAKTON CITY DESCRIPTION

Oakton is the principal city of Hampton County lying on the East bank of the Southeastward flowing Coral River 26 miles upstream from the Atlantic Ocean. The Atlantic shoreline, however, is only about 8 miles to the East. The city is roughly bounded on the north by Scott Creek and on the South by Barney Creek, both emptying into the Coral River. The original city was located on bluffs above the Coral River and its surrounding floodplains and marshes. Continued expansion during the past century has resulted in substantial development in lower lying areas along the Coral River and the creeks.

Average annual rate of population growth has been less than 1.0% over the past three decades and is expected to remain at that low rate indefinitely unless one of several new industries currently being sought by local business and government officials should decide to locate in Oakton. The 1980 population has been reported to be about 48,000 persons, up slightly from the 46,000 reported in 1970. Very little development has occured within the five foot contour at any time but substantial growth between five and twenty feet has occured over the course of the last three decades. In particular, the areas below the bluffs along the Coral River are filled by industrial and high density residential developments.

A hurricane (winds greater than 73 mph) can be expected to strike the area on the average of one year in twenty while a great hurricane (winds greater than 125 mph) can be expected to strike one year in fifty. Flood damage over the last three decades has amounted to several hundred thousand dollars in property damage every two to five years, although local officials expect these amounts to increase due to both inflationary effects and due to greater development below the ten foot contour. The great hurricane in 1952 resulted in seven local deaths, 1500 families left homeless, and over one million dollars in property damage. This was the hurricane which provided storm surges of eight feet above sea level in Oakton. Storm surges of greater than 10 feet above sea level but below 20 feet can be expected one year out of every hundred. Heavy local rains sometimes also produce flooding of local creeks although this effect is minor due to the estuarine character of the area. Other than channelization of parts of James Creek, no important flood control measures have been initiated in the area.

Oakton entered the Regular National Flood Insurance Program a few years ago with a flood plain management program at the Medium Level of Protection (Level III, Table III). This means that land owners will be reimbursed for 50% of the damage incurred due to floods, hurricanes, and storms for all occurences. Resistance to these ordinances has been minimal thus far due primarily to low growth and development pressures. Resistance to the existing ordinance might be expected to increase if the growth rate of the area were to increase dramatically.

The First Ward lies along and below the bluff and consists of lower income households at low densities along the river, an older industrial section along the river and moderate income apartments and townhouses along the bluff above the 20 foot contour. The areas along the river are subject to annual floods of one to three feet but the low income residents are suspicious of attempts at flood control since it may force them from their homes, most of which are owner occupied. Damage to either residential or industrial areas is usually slight due to the relatively low investment contained in most of these structures. (Low and Middle Income, Business)

The Second Ward consists of a comparatively modern industrial and dock area along the river front and Barney Creek backed by a high quality residential development along the lowlands of Barney Creek. Comprising middle and upper income people, this recently built up area contains both single family homes and a large group of apartments, and condominiums just south of Barney Creek below the 10 foot contour. Residents of the ward are largely uninformed about flood control measures and seem unaware of the high flooding potential of their neighborhood. A number of persons in the area are strong supporters of conserving the pleasant green areas and willows along Barney Creek. (Mid and Hi Income, Business, and Conservation.)

The Third Ward occupies most of the downtown business district, a strong middle class low density residential area to the north, plus a group of twenty year old apartments along highway 101 and the edge of the bluff. The population is predominantly conservative and business oriented and is generally opposed to efforts at flood control since it seems only likely to benefit the "riff raff" along the river and the newer rich folks out along Barney Creek. Ward Three has no immediate flooding problems of its own since it is primarily located above the 30 foot contour. (Mid Income and Business)

The Fourth Ward contains the newer developing and still undeveloped sections to the north of the downtown business district and consists largely of the valleys created by Scott and James Creeks. Housing tends to be primarily low density residential and lower income including a number of mobile home parks. The small area of higher density residences near the CBD consists of elderly and lower income rent subsidized housing. One of the city's most treasured parks, Burbank Park, is found along James Creek extending into the Fifth Ward. A few residual farms are still in operation along the outskirts of the built up area and an older agricultural village now within the city limits lies at the extreme eastern edge of the ward. (Low and Mid Income, Business, Conservationists, and Agriculture.)

The Fifth Ward resembles the Fourth, consisting of residual agricultural developments on the periphery plus lower income housing of both densities near the CBD and along the banks of James Creek including the upper half of Burbank Park. A few business holdings are also found along the eastern edge of the CBD. The outlying village at the intersection of highways 17 and 40 has become a stylish close-in bedroom community of middle income people living in restored colonial housing. (Low and Middle Income, Agriculture, Business and Conservationists)

TABLE I. COMMUNITY LAND USE IN ACRES

Land Use Type	Oakton	Hamilton Beach	Hampton County
Low density residential	2600	520	7320
High density residential	480	120	880
Commercial	480	80	560
Industrial	480	40	720
Parks and playgrounds .	160	160	960
Agriculture	1280	0	21760
Vacant	3000	1120	73400
Total	8500	2040	105600
total square miles . . .	13.28	3.19	165.0

TABLE IIB. INTEREST GROUP LAND OWNERSHIP (Acres)

Interest Group	Oakton Wards				
Type	I	II	III	IV	V
Lo Inc.	120	0	0	800	200
Mid Inc.	160	320	720	400	200
Hi Inc.	0	160	0	0	0
Bus. . .	160	440	240	40	80
Conser.	0	40	0	40	80
Agric. .	0	0	0	640	640
TOTAL .	440	960	960	1920	1200

HAMILTON BEACH CITY DESCRIPTION

Hamilton Beach is a small resort town located on the barrier island of Berwick on the South Atlantic coast. A complex series of dunes, reefs, and beaches provide recreational and scenic attractions for summer residents and visitors, while traffic along the intercoastal waterway between the barrier islands and the mainland coastline provides some year round employment and business. Much of the town is located on dunes overlooking the white sand beaches of Hamilton Bay, while an assortment of hotels, summer homes, and cottages line the island's Atlantic shoreline. The island can be reached by the Alexander bridge at it's Southern end, or by the Hamilton Beach ferry at it's Northern end.

The town of Hamilton Beach is small, ranging in size from about 15,000 permanent residents in the winter to over 25,000 residents at the height of the summer tourist season. Since 1970 the population has grown steadily but slowly. Though some local businesses exist on the island, most residents do much of their shopping and other errands in Oakton, which is substantially larger and only about five miles away. As the second largest city in Hampton County, Hamilton Beach plays an important role in Hampton county politics, serving as a meeting center and rallying point for residents and homeowners up and down the Atlantic coastline. While the ten thousand or so summer residents cannot vote directly in local elections, their presence is approved and their interests play an important part in local political decisions.

Hurricanes strike about one year in twenty, causing 50-70% destruction of all structures. Great hurricanes occur about once every fifty years and result in substantial destruction of the community. Loss of life and property damage over the past twenty years has been minimal due to the absence of any hurricanes. Total inundation of the island is to be expected in most major storms. Despite the dangers of an occasional hurricane, most residents are unwilling to support local or county government actions to limit development or to restrict construction to hurricane and flood resistant types of development. Such activities are viewed as "socialist" and are not supported by the general populace.

Hamilton Beach enrolled in the National Flood Insurance program in 1979. They have not yet entered the Regular Phase of the NFIP but their Flood Insurance Study has been completed and local officials are presently considering adopting floodplain management regulations to meet the requirements of the Regular Program requirements of the NFIP (Level II, Table III). As such, property owners in Hamilton Beach are entitled to 50% reimbursement for damages sustained for one occurence only. Subsequent damages will not be covered by insurance unless the community enters a regular program at a higher level of protection.

Land uses are predominantly residential, with low density residential uses in the majority. A small amount of land is used for high density residences and even smaller amounts are used for commercial and public facility purposes. The beaches themselves are either publicly or commercially owned with a 160 acre park providing some developed public access. Except for minor repair facilities no industrial development of any kind exists.

Ward One is made up of the older residential and commercial centers around the old "ferry village at the northern end of the island. Residents and interest groups are primarily middle income and business in orientation. (Mid Income and Business)

The Second Ward is the middle of the island and contains middle income residents along the beaches and lower income residents along the back bay. (Low and Mid Income)

In the Third Ward at the southern end of the island residences are newer and more exclusive including a series of ten story apartment buildings. Residents are primarily "summer folks" of upper income status with a sprinkling of middle income residents in some of the older "cottages." A fairly strong conservation group is active in this ward, concerned primarily with preserving the 160 acre Ocean Front Park located here. (Mid and High Income and Conservationists)

TABLE I. COMMUNITY LAND USE IN ACRES

Land Use Type	Oakton	Hamilton Beach	Hampton County
Low density residential	2600	520	7320
High density residential	480	120	880
Commercial	480	80	560
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Vacant	3000	1120	73400
Total	8500	2040	105600
total square miles . . .	13.28	3.19	165.0

TABLE IIC. INTEREST GROUP LAND OWNERSHIP (Acres)

Interest group	Hamilton Beach Wards		
Type	I	II	III
Lo Inc.	0	80	0
Mid Inc.	160	200	80
Hi Inc.	0	0	120
Bus. . .	120	0	0
Conser.	0	0	160
Agric. .	0	0	0
TOTAL .	280	280	360

ROLE DESCRIPTION - FEMA OFFICIALS (1 Team)

As employees of the Federal Insurance Administration you have two primary responsibilities relating to the residents of the area.

1. You will administer flood insurance payments to property owners who sustain damage as the result of a flood. Payments will be conditioned as follows:

   a) The Community must be enrolled in the National Flood Insurance Program. At the start of the game all communities are in the NFIP program. However, they do have the option to drop out if they choose.

   b) Property owners from eligible communities must request payment on the appropriate forms (available only from FIA officials) indicating they have in fact purchased a flood insurance policy.

   c) For the first flood you will pay all eligible property owners who request reimbursement 50% of the total damage sustained.

   d) If, in subsequent rounds of play, property owners again sustain property damage you may not provide any reimbursement unless the community in which the property owner lives has adopted Flood Protection Level III or higher. If the community has adopted the appropriate level of flood protection, you may again reimburse property owners 50% of total damages sustained.

2. You may provide technical assistance to local communities upon request.

In order to accomplish your tasks most effectively, you may want to appoint certain FIA officials to handle Flood Insurance and others to provide technical assistance.

APPLICATION FOR NATIONAL FLOOD INSURANCE PAYMENT

Name/Bole: ________________

Location: ________________

Round: ____

Land Use Type: __________

No. Acres Damaged: __________

Value (Acres Damaged/40): __________

Business Value (Acres Damaged/20): _______

Amount Requested (Tc maximum of 50% of damage: ______

Amount Awarded: $_______

Request Denied: (explanation) _______________ ________________________

___________ (Signature of FIA Official)

APPLICATION FOR NATIONAL FLOOD INSURANCE PAYMENT

Name/Role: ________________

Location: ________________

Round: ____

Land Use Type: __________

No. Acres Damaged: __________

Value (Acres Damaged/40): __________

Business Value (Acres Damaged/20): _______

Amount Requested (To maximum of 50% of damage: ______

Amount Awarded: $_______

Request Denied: (explanation) _______________ ________________________

___________ (Signature of FIA Official)

ROLE DESCRIPTION - LOCAL GOVERNMENT (1-3 Teams)

As elected officials you are responsible for the health and safety of your constituents as well as maintaining a stable and efficient community. The issues of community growth, flood and hurricane protection, and the management of frictions between other community groups are your foremost concerns, though other goals may also guide your decisions. Your performance will be judged by your constituents in an election at the end of every second round.

Local government has 6 basic powers:

a). You may collect taxes on the PAGAN points received by residents of your jurisdiction. The initial rate is 10% and it may be increased to as much as 40%. If Flood Protection Level V is passed it may reach 50%. The new tax rate must be announced at the end of each round or it is assumed to remain the same as in the previous round.

b). You may place reasonable restrictions on new development by zoning certain areas within your jurisdiction for limited kinds of land uses or for no development at all. You may modify the existing requirement for "balanced" development by requiring developers to provide 40 acres of parkland in addition to the required 40 acres of commercial development to accompany each 240 acres of residential development. New construction requires a building permit signed by local government, but refusal to sign a permit must be justified on the basis of a zoning decision placed on an official zoning map and announced at least one round prior to the refusal to sign. Developers may sue for triple damages if they feel the refusal to sign is arbitrary and capricious. Such suits will be adjudicated by the game operator.

c). You should propose a level of flood protection which accurately reflects the interests of your constituency. Representatives of various wards should be sure they maintain contact with constituencies they represent.

D). You may enact any of the five levels of Flood Protection Programs described elsewhere provided that you meet the necessary costs and other requirements listed.

d). You may have 5 minutes at the end of each round (just before the election in even numbered rounds) to make public announcements regarding your programs, policies, zoning changes, tax rates, etc. You are advised to avoid letting this period turn into a public hearing or the 5 minutes allotted will be quickly used up. Any government or any group of 5 players may petition the game operator for a 10 minute public hearing once each round.

f). You may buy land from other players at the current market rate. If Level V Protection has been enacted you also have the power to condemn land in High Hazard Areas for subsequent purchase by local government.

g). You may assess each interest group an emergency levy of one point whenever a storm of hurricane severity or greater occurs to a community at less than a Level IV Protection Level. These funds are to be used to provide emergency assistance to those interest groups most severely hurt by the storm.

In order to accomplish your objectives and use these powers effectively it is suggested that you appoint one of your members to each major task, e.g., tax collector, building inspector, flood Protection director, and a chairperson to call meetings and deal with the public. If you wish, you may "hire" persons from the community to perform some of these tasks, paying them 1 or 2 points per round.

DEVELOPMENT PERMIT

Location ______ Land Use ______

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved ______

DEVELOPMENT PERMIT

Location _____ Land Use ______

Height _____ No. Acres ______

Base Cost _____ Developer ______

Surcharge_____ Approved ________

DEVELOPMENT PERMIT

Location ______ Land Use ______

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved ______

DEVELOPMENT PERMIT

Location _____ Land Use _____

Height _____ No. Acres _____

Base Cost _____ Developer ______

Surcharge ____ Approved _______

DEVELOPMENT PERMIT

Location ______ Land Use ______

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved ______

DEVELOPMENT PERMIT

Location _____ Land Use ______

Height _____ No. Acres ______

Base Cost _____ Developer ______

Surcharge ____ Approved _______

DEVELOPMENT PERMIT

Location ______ Land Use ______

Height _____ No. Acres _____

Base Cost _____ Developer _____

Surcharge _____ Approved ______

DEVELOPMENT PERMIT

Location _____ Land Use ______

Height _____ No. Acres ______

Base Cost _____ Developer ______

Surcharge ____ Approved _______

DEVELOPMENT PERMIT

Location ______ Land Use ______

Height ____ No. Acres _____

Base Cost _____ Developer ____

Surcharge _____ Approved ______

DEVELOPMENT PERMIT

Location _____ Land Use _____

Height _____ No. Acres _____

Base Cost _____ Developer ______

Surcharge ____ Approved _______

ROLE DESCRIPTION - COMMUNITY BUSINESS (1-7 Teams)

Players represent a specific interest group in each ward or township. They may play their role independently or they may combine forces with other players from the same district, the same interest group in other areas, or on any other basis that seems appropriate.

As local business people you are interested in continued community stability and growth. A larger and more prosperous community will result in larger sales and service revenues, and in most instances the community business group has strongly supported new development. In addition to growth the business group must also address issues of disaster preparedness and flood protection, balancing the cost of these programs against the costs of development and the possible negative effects of restrictions on where new development may occur. These restrictions are explained in the LEVELS OF FLOOD PROTECTION descriptions. Business interests are locatedin every Ward of Oakton, in Beauregard Township, and in Ward I of Hamilton Beach.

As local business people you may undertake new developments in the community. Vacant land may be purchased from the game operator and "developed" at a cost of 10 PAGAN Points per 40 acre unit. The cost of development of parkland or agricultural land is only 3 points per 40 acre unit. Each developement undertaken, however, must be "balanced" in terms of the mixtures of new land uses provided within the same municipality. A "balanced" mixture of land uses is defined as six 40 acre units of residences and one 40 acre unit of commerce or industry. Local government may enact legislation requiring 40 acres of parks and open space to accompany each "balanced" development.

No development may be undertaken without a buildng permit signed by the appropriate local official. It is the responsibility of such officials to insure that additional local requrements for "balance" have been met.

Newly develcped residential units may not be operated by Business players. They must be "sold" to other players representing Residential interests in that ward or township. The purchase price is whatever price can be agreed upon by the two groups of players involved. Commercial or Industrial developments may be retained and operated by the developer or may be sold to another group of business interests. No business property is considered in operation until the Residential units developed with it have been "sold" to legitimate Residential interest groups. Parks and Open Spaces developed in such a package become the property of the local municipality with point benefits going to the local Conservationists.

Each group of players will take fifteen minutes at the start of the game to establish their roles. We ask you to be imaginative and to fill in the role you have been assigned with a variety of personal and professional information which you will create. As you describe yourself to the other people in your group (ward) you will want to describe:

1) your family;

2) your hobbies;

3) your specific profession (i.e., if you are a business interest, what type of business do you operate.); and

4) the roles you have played in the community (both governmental and non-governmental).

CURRENT STATUS FORM - BUSINESS

City or County: ________ Date of Run _____

Ward or Township: ________ Name of Player _______

BASIS	Rd. 1 Status	Rd. 2	Rd. 3	Rd. 4
DEVELOPED ACRES	____	____	____	____
YIELD at 2Pt/40	____	____	____	____
STORM DAMAGE .	___%_	___%_	___%_	___%_
POINTS RECEIVED	____	____	____	____
NEW DEVELOPMENT	_____	_____	_____	_____
LOCATION . .	_____	_____	_____	_____
COST	_____	_____	_____	_____
POINTS SPENT .	_____	_____	_____	_____
FINAL BALANCE .	_____	_____	_____	_____
TOTAL DEV. ACRES	_____	_____	_____	_____

This is your score sheet which you will use to calculate your points during each round. Please note that points are the equivalent of currency for the purposes of this game.

The total number of points allocated to your role at the start of round one is indicated on line 2. This total will remain constant throughout each round regardless of the number of players assigned to each role.

Don't worry if you're a bit confused. This accounting system will be fully explained before the start of the game.

ROLE DESCRIPTION - LOW INCOME HOUSEHOLDS (1-8 Teams)

Players represent a specific interest group in each ward or township. They may play their role independently or they may combine forces with other players from the same district, the same interest group in other areas, or on any other basis that seems appropriate.

As low income households you are concerned about the impacts of community growth and flood damage on your portions of the community. At the same time flood protection proposals frequently emphasize restrictions on new construction and possible relocation and demolition of buildings in the flood plain. Because so much of your property is located in lowlying areas, you should be careful in supporting flood protection measures that may prevent you from developing further and which may even result in elimination of your holdings and your role in the game. It might be advisable to demand relocation assistance as the price for your support of various flood protection proposals. Low income households are located in Wards I,IV, and V of Oakton; in every township of the County; and in Ward II of Hamilton Beach.

Each group of players will take fifteen minutes at the start of the game to establish their roles. We ask you to be imaginative and to fill in the role you have been assigned with a variety of personal and professional information which you will create. As you describe yourself to the other people in your group (ward) you will want to describe:

1) your family;

2) your hobbies;

3) your specific profession (i.e., if you are a business interest, what type of business do you operate.); and

4) the roles you have played in the community (both governmental and non-governmental).

This is your score sheet which you will use to calculate your points during each round. Please note that points are the equivalent of currency for the purposes of this game.

The total number of points allocated to your role at the start of round one is indicated on line 2. This total will remain constant throughout each round regardless of the number of players assigned to each role.

Don't worry if you're a bit confused. This accounting system will be fully explained before the start of the game.

CURRENT STATUS FORM - LOW INCOME HOUSEHOLDS

City or County: ________ Date of Run ______

Ward or Township: ________ Name of Player _______

BASIS	Rd. 1 Status	Rd. 2	Rd. 3	Rd. 4
DEVELOPED ACRES	___	___	___	___
YIELD at 1Pt/40	___	___	___	___
STORM DAMAGE .	___%_	___%_	___%_	___%_
POINTS RECEIVED	___	___	___	___
NEW DEVELOPMENT	____	____	____	____
LOCATION . .	____	____	____	____
COST	____	____	____	____
POINTS SPENT .	____	____	____	____
FINAL BALANCE .	____	____	____	____
TOTAL DEV. ACRES	____	____	____	____

ROLE DESCRIPTION - MIDDLE INCOME HOUSEHOLDS (3-12 Teams)

Players represent a specific interest group in each ward or township. They may play their role independently or they may combine forces with other players from the same district, the same interest group in other areas, or on any other basis that seems appropriate.

As middle income households you are interested in maintaining the current status of the community. Issues of community growth and flood protection are important to you, but the costs associated with them may make them undesirable or dangerous to your position. Rapid community growth opens the door to "new elements" in the community which may threaten community stability and the relatively powerful position of the middle class. While increased levels of flood protection are desireable for both economic and humanitarian reasons, as major tax payers your interest group will pay a major share of the costs. The benefits to your interest group will be less than to some other groups since most of your property holdings are already located at higher elevations. Middle income households are located in every Ward and Township in the County.

Each group of players will take fifteen minutes at the start of the game to establish their roles. We ask you to be imaginative and to fill in the role you have been assigned with a variety of personal and professional information which you will create. As you describe yourself to the other people in your group (ward) you will want to describe:

1) your family;

2) your hobbies;

3) your specific profession (i.e., if you are a business interest, what type of business do you operate.); and

4) the roles you have played in the community (both governmental and non-governmental).

This is your score sheet which you will use to calculate your points during each round. Please note that points are the equivalent of currency for the purposes of this game.

The total number of points allocated to your role at the start of round one is indicated on line 2. This total will remain constant throughout each round regardless of the number of players assigned to each role.

Don't worry if you're a bit confused. This accounting system will be fully explained before the start of the game.

CURRENT STATUS FORM - MIDDLE INCOME HOUSEH

City or County: ________ Date of Run _____

Ward or Township: ________ Name of Player ____

BASIS	Rd. 1 Status	Rd. 2	Rd.
DEVELOPED ACRES	___	___	__
YIELD at 1Pt/40	___	___	
STORM DAMAGE .	___%	___%	.
POINTS RECEIVED	___	___	
NEW DEVELOPMENT	____	____	
LOCATION . .	____	____	
COST	____	____	
POINTS SPENT .	____	____	
FINAL BALANCE .	____	____	
TOTAL DEV. ACRES	____	____	

ROLE DESCRIPTION - HIGH INCOME HOUSEHOLDS (0-2 Teams)

Players represent a specific interest group in each ward or township. They may play their role independently or they may combine forces with other players from the same district, the same interest group in other areas, or on any other basis that seems appropriate.

As high income households you are interested in improving the overall quality of the community without being forced to pay higher taxes. Higher levels of flood protection significantly increase the construction cost for many of Hampton County's scenic but flood prone waterfront areas, and some individuals have suggested that these higher costs may discourage individuals other than high income players from building there. One the whole, you tend to oppose community growth which might challenge your status. Seeing flood protection measures as an inhibition to growth, you tend to favor higher levels of protection on both personal and intellectual grounds. High income households are located only in Ward II of Oakton and in Ward III of Hamilton Beach.

Each group of players will take fifteen minutes at the start of the game to establish their roles. We ask you to be imaginative and to fill in the role you have been assigned with a variety of personal and professional information which you will create. As you describe yourself to the other people in your group (ward) you will want to describe:

1) your family;

2) your hobbies;

3) your specific profession (i.e., if you are a business interest, what type of business do you operate.); and

4) the roles you have played in the community (both governmental and non-governmental).

This is your score sheet which you will use to calculate your points during each round. Please note that points are the equivalent of currency for the purposes of this game.

The total number of points allocated to your role at the start of round one is indicated on line 2. This total will remain constant throughout each round regardless of the number of players assigned to each role.

Don't worry if you're a bit confused. This accounting system will be fully explained before the start of the game.

CURRENT STATUS FORM - HIGH INCOME HOUSEHOLDS

City or County: ________ Date of Run _____

Ward or Township: ________ Name of Player _______

BASIS	Rd. 1 Status	Rd. 2	Rd. 3	Rd. 4
DEVELOPED ACRES	___	___	___	___
YIELD at 1Pt/40	___	___	___	___
STORM DAMAGE .	___%_	___%_	___%_	___%_
POINTS RECEIVED	___	___	___	___
NEW DEVELOPMENT	____	____	____	____
LOCATION . .	____	____	____	____
COST	____	____	____	____
POINTS SPENT .	____	____	____	____
FINAL BALANCE .	____	____	____	____
TOTAL DEV. ACRES	____	____	____	____

ROLE DESCRIPTION - AGRICULTURE (0-4 Teams)

Players represent a specific interest group in each ward or township. They may play their role independently or they may combine forces with other players from the same district, the same interest group in other areas, or on any other basis that seems appropriate.

As farmers you are interested in maintaining existing lands under cultivation and preventing the allocation of too much vacant or agricultural land for new development. In general you oppose growth as a threat to your own status but you are not opposed to selling some of your own farm land at a good profit to others looking for developable acreage. Taxes are burdensome, especially for farms located within the city limits. Your lands suffer very little from flood or wind damage except for occasional soil salinization due to high tides. As a result you tend to be indifferent to flood protection proposals except for the costs and taxes they require. Agricultural interests are located in Wards IV and V of Oakton and in Anne and Beauregard Townships.

Each group of players will take fifteen minutes at the start of the game to establish their roles. We ask you to be imaginative and to fill in the role you have been assigned with a variety of personal and professional information which you will create. As you describe yourself to the other people in your group (ward) you will want to describe:

1) your family;
2) your hobbies;
3) your specific profession (i.e., if you are a business interest, what type of business do you operate.); and
4) the roles you have played in the community (both governmental and non-governmental).

This is your score sheet which you will use to calculate your points during each round. Please note that points are the equivalent of currency for the purposes of this game.

The total number of points allocated to your role at the start of round one is indicated on line 2. This total will remain constant throughout each round regardless of the number of players assigned to each role.

Don't worry if you're a bit confused. This accounting system will be fully explained before the start of the game.

CURRENT STATUS FORM - AGRICULTURE

City or County: ________ Date of Run ____

Ward or Township: ________ Name of Player ______

BASIS	Rd. 1 Status	Rd. 2	Rd. 3	Rd. 4
DEVELOPED ACRES	___	___	___	
YIELD at 1Pt/640	___	___	___	___
STORM DAMAGE . .	___%	___%	___%	___%
POINTS RECEIVED	___	___	___	
NEW DEVELOPMENT	____	____	____	____
LOCATION . .	____	____	____	____
COST	____	____	____	____
POINTS SPENT . .	____	____	____	____
FINAL BALANCE .	____	____	____	____
TOTAL DEV. ACRES	____	____	____	____

ROLF DESCRIPTION - CONSERVATIONISTS (1-8 Teams)

Players represent a specific interest group in each ward or township. They may play their role independently or they may combine forces with other players from the same district, the same interest group in other areas, or on any other basis that seems appropriate.

Conservationists are concerned with the preservation of existing parks and playgrounds, the control of new development, and the maintenance of existing natural barriers and safeguards against flooding. While you favor the growth restraints contained in flood protection proposals, you fear that providing higher levels of protection and insurance may make some ecologically sensitive areas more available to new development. Since Conservationists are not actually property owners like other players in the game, your major activity will have to involve encouraging other players to behave more responsibly towards the environment. Such encouragement may be through persuasion or through legislation as well as through the direct exercise of political and financial power where you have only a small amount of clout.

One of your more promising strategies is to encourage more park developments in low lying and sensitive areas - paying development costs with public funds when possible but offering some of your own points in support as well. You may be able to convince your local goernment to pass legislation requiring that developers provide 40 acres of parks and open space as part of a legally required "balanced" development package necessary for approval of building permits. Other players probably do not realize that the number of points you receive is based upon the amount of land in parks and playgrounds; whether publicly or privately owned. Since existing parkland is publicly owned, Conservationists do not normally have to pay taxes to local government. Taxes must be paid, however, on income from privately owned parks. Conservationists are located in Wards II, IV, and V of Oakton; in Ward III of Hamilton Beach; and in all four of the County Townships.

Each group of players will take fifteen minutes at the start of the game to establish their roles. We ask you to be imaginative and to fill in the role you have been assigned with a variety of personal and professional information which you will create. As you describe yourself to the other people in your group (ward) you will want to describe:

1) your family;

2) your hobbies;

3) your specific profession (i.e., if you are a business interest, what type of business do you operate.); and

4) the roles you have played in the community (both governmental and non-governmental).

CURRENT STATUS FORM - CONSERVATIONISTS

City or County: ________ Date of Run ______

Ward or Township: _________ Name of Player ________

BASIS	Rd. 1 Status	Rd. 2	Rd. 3	Rd. 4
DEVELOPED ACRES	____	____	____	____
YIELD at 1Ft/40	____	____	____	____
STORM DAMAGE .	___%_	___%_	___%_	___%_
POINTS RECEIVED	____	____	____	____
NEW DEVELOPMENT	_____	_____	_____	_____
LOCATION . .	_____	_____	_____	_____
COST	_____	_____	_____	_____
POINTS SPENT .	_____	_____	_____	_____
FINAL BALANCE .	_____	_____	_____	_____
TOTAL DEV. ACRES	_____	_____	_____	_____

This is your score sheet which you will use to calculate your points during each round. Please note that points are the equivalent of currency for the purposes of this game.

The total number of points allocated to your role at the start of round one is indicated on line 2. This total will remain constant throughout each round regardless of the number of players assigned to each role.

Don't worry if you're a bit confused. This accounting system will be fully explained before the start of the game.

STEPS OF PLAY

A normal round is 30 minutes long with twice as much time given in the first round to allow players to familiarize themselves with the mechanics of the game. The end of a round is indicated by a bell, whistle, or siren indicating that the flood season has arrived. There are six steps in each round with the first two controlled by the game operator. The next 3 are controlled by players themselves and may overlap to some degree. The last step allows local government 5 minutes to make public announcements and 5 minutes to elect or re-elect city officials in even numbered rounds.

STEP 1: WEATHER - The first step is to determine the amount of damage which occurred through storms and floods during the previous 5 years. Probability dice are rolled 5 times to determine the severity of the storms and the amount of damage inflicted in each year. The Flood Damage Table gives the probabilities of various levels of floods and the amount of damage suffered under various levels of protection. Damage is reported as a percentage loss to all properties in each ward. The magnitude of the loss is based upon the number of developed parcels lying within the floodplain (below the 20 foot contour). Loses may be decreased by providing higher protection levels for already existing properties, by preventing further developments in the floodplain, and by eliminating existing properties from the flood plain.

Rules

1. The game operator rolls probability dice 5 times (once for each year). The numbers on the dice will tell the game operator what level of flood or hurricane has hit the communities in each of the previous five years.

STEP 2: POINTS - The success of each team is partially reflected by the number of points accumulated. Each team starts with a specific number of points and more are collected in successive rounds. These points may be used to purchase additional developments, build additional developments (Business teams only), pay taxes, rebuild damaged properties, and influence other players through contributions, gifts, etc. Points are earned by "owning" developed land. They may be lost through natural forces such as floods (the percentage loses determined in Step 1), or through poor financial planning.

Rules

1. Initial Points - Each interest group has been assigned ownership of a specific number of acres of developed land. The amount of land owned is given on line 2 of the Current Status Form provided with each role description. The location is described in the community description and is indicated on the community map. The type of development corresponds initially to the type of inerest group.

i) Residential interest groups receive one point for every 40 acres of undamaged residential land owned.

ii) Business interests receive two points for every 40 acres of undamaged Commercial of Industrial land uses owned.

iii) Conservationists receive one point for every 40 acres of parks which exist in their ward or township, although this land is usually owned by the local municipality.

iv) Agriculture interests receive one point for every 640 acres of undamaged agricultural land owned.

v) Local officials receive points through taxation. Local officials should be careful to not confuse the public points they control with the points owned by the interest groups they originally belonged to. Mixing the two is considered unethical.

2. Increasing Points - Additional points are earned by acquiring additional 40 acre parcels of land. These are acquired by purchasing them from one of the Business teams at a price negotiated between the buyer and seller. Points are paid out by the game accountant during the second step of play based upon transactions completed during the previous round.

3. Decreasing Points - Players receive fewer points if property controlled by them is damaged by floods or hurricanes in Step 1. The decrease in points received is proportional to the percentage damage received rounded to the nearest whole number of points. The percent damage to properties in each ward or township due to various types of storms is given in TABLE IV, the Storm Damage Table. In the event of a storm of hurricane severity or greater, all interest groups in communities at Less than a Level IV level of Protection must pay a one point emergency payment to local government to help defray costs of emergency assistance.

4. Property Damage - Once damaged by a hurricane or flood, a development is assumed to continue in the same damaged condition yielding a lower return of points unless the owner decides to repair the property. Damaged property may be repaired at a cost per 40 acre unit equal to the percentage of damage being repaired times 10 points (the cost of original contruction).

5. Insurance - Property owners in communities enrolled in the Flood Insurance Program are usually eligible for flood insurance payments providing 50% of the value of the

property damage sustained. Damaged property owners must file a claim form with the FEMA Officials who will approve or disapprove the claim and pay the appropriate points. These points may be used for repairs or towards the purchase of new properties.

6. Accounting - Players are expected to calculate the number of points they are entitled to receive each round on the Current Status Form accompanying each role description. The game accountant will review this information each round before paying out the PAGAN points which have been earned.

STEP 3: TAXES - Each city and the county is empowered to collect taxes at a level determined by local government but varying between 10% and 40% of the points earned. For the first round the tax rate is set at 20% for each of the three towns. At the end of the first round each government must announce the new tax rate for the next round. Taxes due are rounded up or down to the nearest whole integer of points received at Step II of the current round. Conservationists are exempt from paying taxes on their properties.

STEP 4: DEVELOPMENT - Players from Business Interest teams may develop additional groups of 40 acre parcels of land in any location provided they have a signed Development Permit from the Building Inspector of the jurisdiction where the development is to occur. Development may occur only on land currently owned by the Business Team.

Rules

1. A Business Team may purchase land from the operator or from other teams at whatever price can be agreed upon. All land sales must be recorded on the Current Status Form of both buyer and seller. The buyer can earn points on developed land only if he/she represents an interest group appropriate to the type of development involved. Existing developments may be demolished at a cost of 2 points per 40 acres of land to be cleared. Building permits are issued by local government officials when they have determined that the proposed development is in compliance with local zoning regulations, the general and local requirements for "balanced" combinations of development, and other development controls enacted locally including those required by approved hazard management programs.

2. A "balanced" combination of new developments is defined as six 40 acre parcels of residential development and one 40 acre parcel of commercial or industrial development. Local government may modify this "balanced" development requirement to require one additional 40 acre parcel of parks and open space.

3. The cost to develop a 40 acre parcel of land for most uses is ten points. Parks and Agricultural land costs 3 points per 40 acres. To reflect the existance of public services and roads, however, new development can only occur on parcels sharing at least one side with a previously developed parcel . The cost of development of a parcel may be increased by 10-35% (the development surcharge) due to construction requirements imposed by the flood protection level currently in effect.

4. Additional points earned by newly developed land parcels is not paid out until Step 2 of the next round.

5. Teams may combine points with other teams in any combination that seems workable regardless of interest group designation or location. However, one team must be clearly designated as the party eligible to receive points from the accountant for any land developed through such combinations.

STEP 5: PROTECTION - Local government may enact one of the five hazard protection levels listed on Table III, the Levels of Flood Protection Table.

Rules

1. Local government may enact one of the five hazard protection levels, pass appropriate zoning legislation and hold those referendums which may be required to implement the new level.

2. Read the descriptions of the flood hazard protection levels carefully to determine the exact requirements for enactment. All costs and other requirements must be met or the protection level provided in the previous level continues by default.

3. Note that the costs and protections listed are cumulative from one level to the next. Only the difference between the new level and the previous level applies to either costs or benefits.

4. It is the local government's responsibility to obtain the necessary points to implement the flood protection program selected either through taxes, donations, or other sources.

STEP 6: ELECTION - As the last step in each round, each local government is allowed five minutes to address their citizens. This would normally consist of announcements of new levels of protection provided, new tax rates, new zoning restrictions and so on and might include appeals for reelection or passage of upcoming referenda.

Rules

1. Following any announcements referenda may be held and in even numbered rounds an election of local officials is held. Please note that any level of flood protection beyond Level II requires a referendum. If the required referendum has not already been held as a part of Step Five above, it must be held at this time.

2. Also during this period, any group of five or more players may petition the local government and the game operator for a hearing if some pressing issue has not been adequately handled or discussed.

TABLE III. LEVELS OF FLOOD PROTECTION

(All costs and change figures are relative to Level I. Actual costs and changes are the difference between current level and new level to be enacted.)

I NO PROTECTION: Development permitted with no effort to mitigate against potential flood damages. Community chooses not to enter or remain in N.F.I.P. No flood insurance is available to local property owners.

COST TO IMPLEMENT: 0 Points
CHANGE DAMAGE BY: 0 %
CHANGE CONSTRUCTION COST BY: 0 Points
NO ENACTMENT REQUIRED - Default condition

II MINIMAL PROTECTION: Community adopts minimum FIA regulations. New construction within the 100 year flood plain or in designated High Hazard Areas must be elevated on pilings to the 100 year flood height. New construction in High Hazard Areas must also be securely anchored and built to withstand wave action. Insurance payments will cover 75% of the losses for the first occurance only. No coverage is provided for subsequent damages.

COST TO IMPLEMENT: 40 Points
CHANGE DAMAGE BY: -10 %
CHANGE CONSTRUCTION COST BY: +10 Points
ENACTMENT BY ANY CITY OR COUNTY GOVERNMENT
REQUIRES DESIGNATION OF HIGH HAZARD AREAS

III MEDIUM PROTECTION: Community adopts minimum N.F.I.P. requirements. New construction within the 100 year floodplain must be elevated one foot above 100 year flood levels and must be floodproofed. Existing structures which are not floodproofed are designated as in violation of the local building code. New construction in High Hazard Areas must be elevated to a height above maximum recorded wave heights and must be located behind primary dunes. Insurance payments will cover 75% of the losses for each occurance.

COST TO IMPLEMENT: 100 Points
CHANGE DAMAGE BY: -20 %
CHANGE CONSTRUCTION COST BY: +15 Points
COMMUNITY REFERENDUM TO ADOPT NEW BUILDING CODE
ENACTMENT BY ANY CITY OR COUNTY GOVERNMENT - IF REFERENDUM PASSES
REQUIRES DESIGNATION OF PRIMARY DUNE LINE AT 5 FOOT CONTOUR

IV HIGH PROTECTION: Any alteration of primary protective geological structures such as dunes, beaches, river banks and bluffs is prohibited without a special impact statement approved by the county engineer, the county board of commissioners, and the governing body of the affected local jurisdiction. As in MEDIUM PROTECTION, new construction in the 100 year flood plain must be elevated 1 foot above the 100 year flood levels. County and local government coordinate in developing community hurricane evacuation plans and post-disaster recovery plans which include public acquisition of most seriously damaged properties and relocation assistance to affected residents. Insurance payments will cover 75% of the losses for each occurance.

COST TO IMPLEMENT:	180 Points
CHANGE DAMAGE BY:	-40 %
CHANGE CONSTRUCTION COST BY:	+25 Points

THE EVACUATION PLAN MUST BE PASSED BY THE LOCAL GOVERNMENT AND PUBLICLY POSTED.

PRIMARY GEOLOGICAL PROTECTIVE STRUCTURES MUST BE DESIGNATED

EVACUATION REFUGE AREAS MUST BE DESIGNATED AND STOCKPILED

REFERENDUM IN AFFECTED COMMUNITIES MUST APPROVE POLICY OF PUBLIC PURCHASE OF FLOOD DAMAGED PROPERTIES.

V HIGHEST PROTECTION: Adopt a fully integrated hazard mitigation and natural resource protection program, including all of the measures described under HIGH PROTECTION above. In addition institute a permit system to regulate development on ecologically vital areas within the community, including wetlands, coral reefs, and edge zones. Begin now to acquire by condemnation and and purchase land and buildings in the most flood hazardous areas. Provide for removal of structures, restoration of area to its natural state and relocation of affected residents. Insurance payments will cover 75% of the losses for each occurance.

COST TO IMPLEMENT:	300 Points
CHANGE DAMAGE BY:	-60%
CHANGE CONSTRUCTION COST BY:	+35 Points

HIGH PROTECTION MUST HAVE BEEN IN EFFECT AT LEAST 1 ROUND EARLIER.

REQUIRES APPROVAL OF EACH LOCAL GOVERNING BODY PLUS PASSAGE OF A REFERENDUM TO RAISE THE TAX LIMIT.

ALLOWS LOCAL GOVERNMENT TO RAISE TAXES AN ADDITIONAL 10% TO PROVIDE FUNDS FOR PURCHASING FLOOD HAZARD AREAS.

TABLE IV. STORM DAMAGE

Percent Damage by Location, Protection Level, and Sto

PROTECTION LEVEL	Oakton Wards					Hamilton Beach Wards			Ha
	I	II	III	IV	V	I	II	III	A
LIGHT STORMS. Prob. = 0.50, No's. = 51-100, a "go									
SEVERE STORMS. Prob. = 0.25, No's. = 26-50, "a 1-9									
I	20	20	0	10	0	50	40	50	
II	0	10	0	0	0	40	30	40	
III	0	0	0	0	0	30	20	30	
IV	0	0	0	0	0	20	0	20	
V	0	0	0	0	0	10	0	10	
HURRICANE. Prob. = 0.15, No's. = 11-25, an "11-30									
I	40	40	20	30	20	70	60	70	
II	30	30	10	20	10	60	50	60	
III	20	20	0	10	0	50	40	50	
IV	10	10	0	0	0	40	30	40	
V	0	0	0	0	0	30	20	30	
GREAT HURRICANE. Prob.=0.08, No's.=3-10, a "31-70									
I	60	60	40	50	40	90	80	90	
II	50	50	30	40	30	80	70	80	
III	40	40	20	30	20	70	60	70	
IV	30	30	10	20	10	60	50	60	
V	20	20	0	10	0	50	40	50	
HOLOCAUST! Prob.=0.02, No's.=1-2, a "71-500 yea									
I	90	90	70	80	70	100	100	100	
II	80	80	60	70	60	90	90	90	
III	70	70	50	60	50	80	80	80	
IV	60	60	40	50	40	70	70	70	
V	50	50	30	40	30	60	60	60	

OPERATOR'S INSTRUCTIONS

NUMBER OF PLAYERS: PAGAN-Coastal has been designed to accomodate a large variety of players. Some approximate knowledge of the number of players to be accomodated must be available before the game, however, in order to decide which of the political jurisdictions are to be employed in the game run. In general, two or even three players are preferred in each role in order to force players to discuss their decisions among themselves, thus improving the information flow and learning potential of the game. Having at least two players in each role also allows for one to serve as a public official while the other can stay "at home" taking care of the special interests of the role.

The total game consists of 41 interest groups or roles plus 14 elected officials in the 3 jurisdictions and a team of FEMA officials. For a small group of players, the City of Hamilton Beach alone could be played involving 7 interest groups plus 3 elected officials and the FEMA officials. Ideally this would involve 2 players per interest group with three to be elected to public office plus 1 or 2 persons assigned to represent FEMA for a total of 15-16 players. As few as nine players could be accomodated if 1 were appointed to each interest group, the city government, and FEMA.

Other combinations of 2-3 persons per team plus the use of larger jurisdictions and combinations of jurisdictions provides a considerable range of ways in which varying numbers of players may be accomodated in varying arrangements of the game. The table below summarizes these possibilities.

	NUMBER OF PLAYERS		
	OPTIMUM	MINIMUM	MAXIMUM
HAMILTON BEACH ONLY	16	9	24
HAMPTON COUNTY ONLY	32	17	48
OAKTON ONLY	40	21	60
HAMILTON BEACH + COUNTY	46	25	69
OAKTON AND HAMILTON BEACH	54	29	81
OAKTON AND COUNTY	70	37	105
ALL THREE JURISDICTIONS	84	45	126

ROOM ARRANGEMENTS: A separate table for each ward or township plus one for each governing body and the FEMA officials should be arranged in a single large room in a pattern roughly conforming to their geographic distribution on the county map. Enough room must be provided to allow players relatively easy access to each other's tables for purposes of bargaining and discussion. The table for the elected officials should be located near the center of their respective wards and townships while the table for the game operator and accountants should be located off to the side, preferably near a blackboard or bulletin board.

If a single large room is not available, each jurisdiction played could be located in a separate smaller room. Provison for movement between rooms must be made, however, and a sngle larger meeting area where all players can come together for "community meetings" and the debrifing at the end of the game is desireable. Separate rooms for each jurisdiction usually results in lower levels of communication and cooperation between them, a situation it may be desireable to simulate in order to make plaers struggle with ways to oercome these problems.

Each table and/or room should be clearly labelled with the name of the jurisdiction an ward or township seated there.

EQUIPMENT: aside from paper and pencils, the only special equipment required by the game is some method of generating random numbers from 1 to 100 and some type of overlay map of the county large enough and displayed prominently so that players may refer to it in their discussions and so that changes in land uses may be recorded upon it.

Probability dice consisting of a pair of icosohedrons can usually be purchased in local hobby shops. Before casting them for the players be sure they understand which die represents the tens digits and which the units digits. Usually 00 is taken as 100. If probability dice are not readily available, a table of random numbers may be found in the back of most statistics texts. another possibility is to put 20 slips of paper into a paper bag. Two slips each should be numbered from 0 to 9. drawing two slips of paper from the bag then generates two numbers with the ist number designated as the tens digit and the second number as the units digit.

The large map of the county may be sketched fairly roughly since its major purpose is simply as a focus for discussion and to provide some location where major changes in land uses can be indicated. An overlay of acetate or other erasable transparency will allow the map to be readily changed with grease pencils.

PRIOR TO PLAY: If possible, several days before the game all players should receive a copy of the Introduction, the Overview, the Steps of Play, a City or County Map, an appropriate Community Description including Tables I and II, the Levels of Flood Protection Table (Table III), and the Storm Damage Table (Table IV). Specific role descriptions should usually not be provided beforehand in order to ensure that each role is filled at the time of play by assigning them only at the actual start of the game.

It is preferable to assign players to their roles first and to then ask them to choose their elected representatives from among themselves at the rate of one representative from each ward to serve on the City Council plus one representative from each city and each township to serve on the County Board of Supervisors. In this way they tend to have a clearer image of the fact that they are representing a particular constituency. If necessary, however, players may be assigned directly to local government immediately at the beginning of play. In any event, role descriptions for local government including Building Permit Forms should be placed on the appropriate tables prior to the start of the game.

Enough copies of each role description to provide one for each player should be reproduced before the game. Extra copies of the Steps of Play, Storm Damage Table, Flood Protection Table, and the Community Descriptions should also be reproduced prior to play since many of the players will fail to bring their copies with them to the actual game run.

Fill out a Current Status Form for each role being played and place several copies on the apropriate tables just before play begins or have an assistant pass these forms out to the apropriate interest groups while you are making your introductory remarks. Acreage figures and points for each interest group are given in the Interest Group Points Allocation Table (Table V) presented at the end of the Operator's Instructions section.

A single experiened operator can probably handle a game involving only one municipality. If inexperienced, an accountant assistant should be used for even a small game run. If two or more jurisdictions are being used in the same game, two or even three accountant assistants should be used to assist the game operator.

DURING PLAY - Only a very brief 5-10 minute introduction to the game should be provided prior to beginning the first round. Players usually have many questions to ask prior to play but answering them before the game often creates more confusion than help. Most questions are much better answered during and immediately after the first round of play. The introduction should consist of quickly pointing out the locations of the various interest groups and governments, the Steps of Play, the Storm Damage Table, the Levels of Flood Protection, the maps and the Current Status Form accompanying each of the role descriptions. Players should be asked to locate their ward and their land developments on the land use map and to note the corresponding acreage figures given on the Current Status form.

Players should be informed that the number of points they are about to receive are based upon the number of acres of land they own in their ward or township less a percentage equal to the amount of storm damage received in each of the last five years. The amount of land owned may be increased by the players following the procedures outlined in the Development Step of Play.

Prior to the first step of play, local officials must be elected if you have not already appointed them. Allow plaers a few minutes to discuss this among themselves and then call for the election. Remind them that the position is only held for two rounds and that they will have a chance to change their choices at the end of the next round. Some forcefulness may be called for here in order to get the election carried out quickly.

Immediately following the election and the movement of the elected players to the tables provided for their respective goernments, announce the beginning of the game with the arrival of the hurricane season. Explain the meaning and use of the dice and roll them the first time. Then refer players to the Storm Damage Table and show them how the severity of the storm and the associated damage levels are determined by the numbers rolled by the dice. Roll the dice four more times to represent the remaining four years and announce the total impact of storms over the previous five years in terms of the total amunt of damage accumulated. This varies by ward or townsip but pointing out one or two such cases and summing the percentages is usually enough to make players understand how the procedure works.

Players should then be instructed to fill out their Current Status Forms and go to the accountant to receive their initial PAGAN Points, thus initiating the second step of play. While this is going on, the operator sould circulate among individual tables to help players to determine their total damages and complete their Current Status Forms. Some confuson can be expected here during the first round but by the second round this step should be quite straightfoward. While individual teams are obtaining their points, turn to the FEMA officials and warn them that they should be encouraging insured teams to make insurance claims for damages sustained. Players should be informed that they may be eligible for insurance and that they should check the rules under the second step of play as well as the FEMA officials to determine their eligibility.

Gradually most players will have worked themselves through the second step of the round. Points will have been collected and insurance forms filled out and possibly approved. FEMA officials will need some PAGAN Points to meet the claims filed. The operator should provide these carefully in order to make the FEMA officials a little cautious in approving claims. In general, the operator should provide just enough funds to meet all legitimate claims but should give the clear impression that funds will not be provided for poorly handled or spurious claims. A careful review of the claims filed in the first round is usually sufficient to make FEMA officials behave responsibly in later rounds.

While all this is happening, local government should be meeting and appointing its own officers as suggested in their role descriptions. Urge them to appoint the tax collector right away so that you can help him/her begin to collect taxes at the first round rate of 20% as soon as individual teams have collected their points from the accountant. This gets the third step of play under way and completed while steps 1 and 2 are still underway for some of the players

The initiation of step 4 may require a little more deliberate and separate discussion, although a few teams may have already moved into this step while you have been helping others through the earlier steps. At this point, the Business Teams in particular should be advised as to how they may undertake development, purchasing land from the operator and putting together enough funds to make up a "balanced" development package. It is likely that several Business Teams may have to combine resources in order to gain enough points for both land purchase and contruction. It may be that only part of the land purchases may be accomplished in the first round and no development will occur.

The operator is cautioned to exercise some care in allowing Busines Teams to buy land. Development as an option in the game is desireable and necessary for realism in competition with flood proction issues. Some players may become totally engrossed in development, however, and prevent the entire community from considering flood protection programs. Some competition for attention and resources is desireable but the operator can and should limit such efforts by refusing to sell enough land or making the prices for land high enough to inhibit too much development. It may take two or three rounds before any developer or combination of developers will have enough funds available to put a complete development package together.

While all this is going on, many players including local government should be considering the possibility of enacting higher levels of flood protection, i.e., undertaking step 5. The operator should be ready to help explain the meaning of the various levels and to show how the amount of protection provided decreases the amount of damage shown in the Storm Damage Table. Local Government officials should be cautioned to make sure they have enough funds available to pay for the level of protection enacted and that they are aware of any referendums which may be required.

Finally, the elected spokesperson for local government should be coached to prepare a statement and agenda for step 6. Announcements must be made, referenda held, and perhaps a brief public hearing allowed for. Following completion of the public hearing the operator should step in to answer questions. After some discussion of the events in round one, the operator should point out that the players now know most of the rules and that the next round can and should proceed much more quickly. The operator then pulls out the probability dice thereby announcing the start of the next round and the arrival of the hurricane season.

The second and third rounds should proceed much more quickly and with less and less need for the intervention of the operator. Players should be encouraged to get into side discussions on the relative merits of various levels of flood protection and the ways in which it effects the community. As the third round draws to a close, it is probably time to consider breaking off the actual play of the game and leading the participants into a more general discussion of what has happened during the game.

DEBRIEFING - Individual style dictates the manner in which the debriefing is to be held but several steps of discussion often help to lead the players out of the game and back into issues to be addressed in the real world.

Some time is needed in the beginning of every debriefing to allow players to let off steam. Ask one or two of the players to describe what they were trying to accomplish and how well they succeeded. If several jurisdictions are being played, asking for a report from each and drawing comparisons among them may be helpful.

After a short time, however, players should be directed away from happenings in the game towards broader questions regarding the significance of what happened to their interest groups. Did their flood protection program work? What kinds of problems were encountered in trying to get higher levels of protection passed? Were these problems realistic? Which groups worked for flood protection programs and which ones were opposed? Why did they take these stands?

Fairly quickly the discussion will take on its own character and lead players away from the game towards much broader discussions of flood protection issues and philosophies. At some point along here the game and the debriefing ends and the conference picks up again. In closing, thank the players for their participation. Then go buy yourself and your assistants a couple of good stiff drinks.

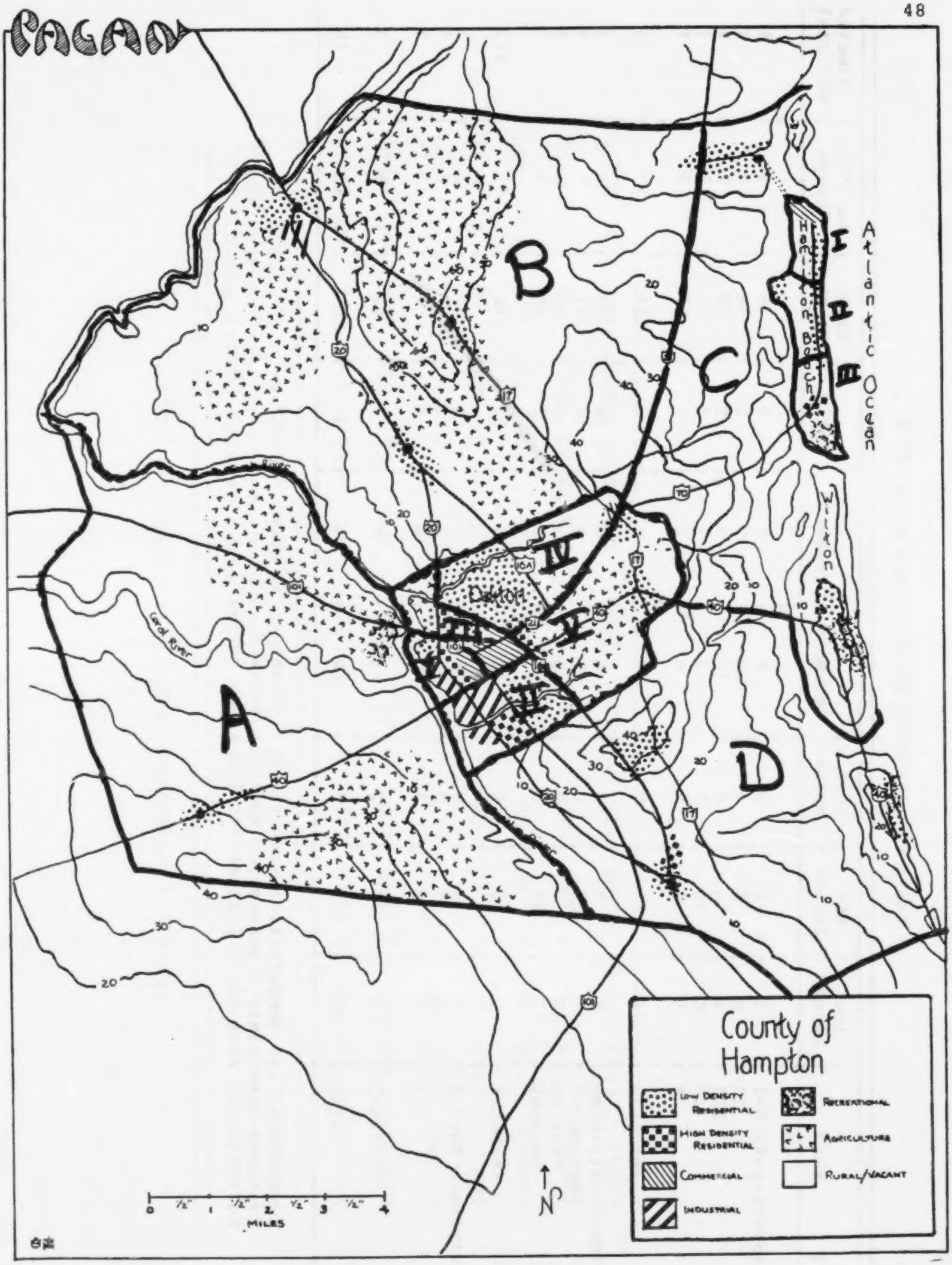
TABLE II. INTEREST GROUP LAND OWNERSHIP (Acres)

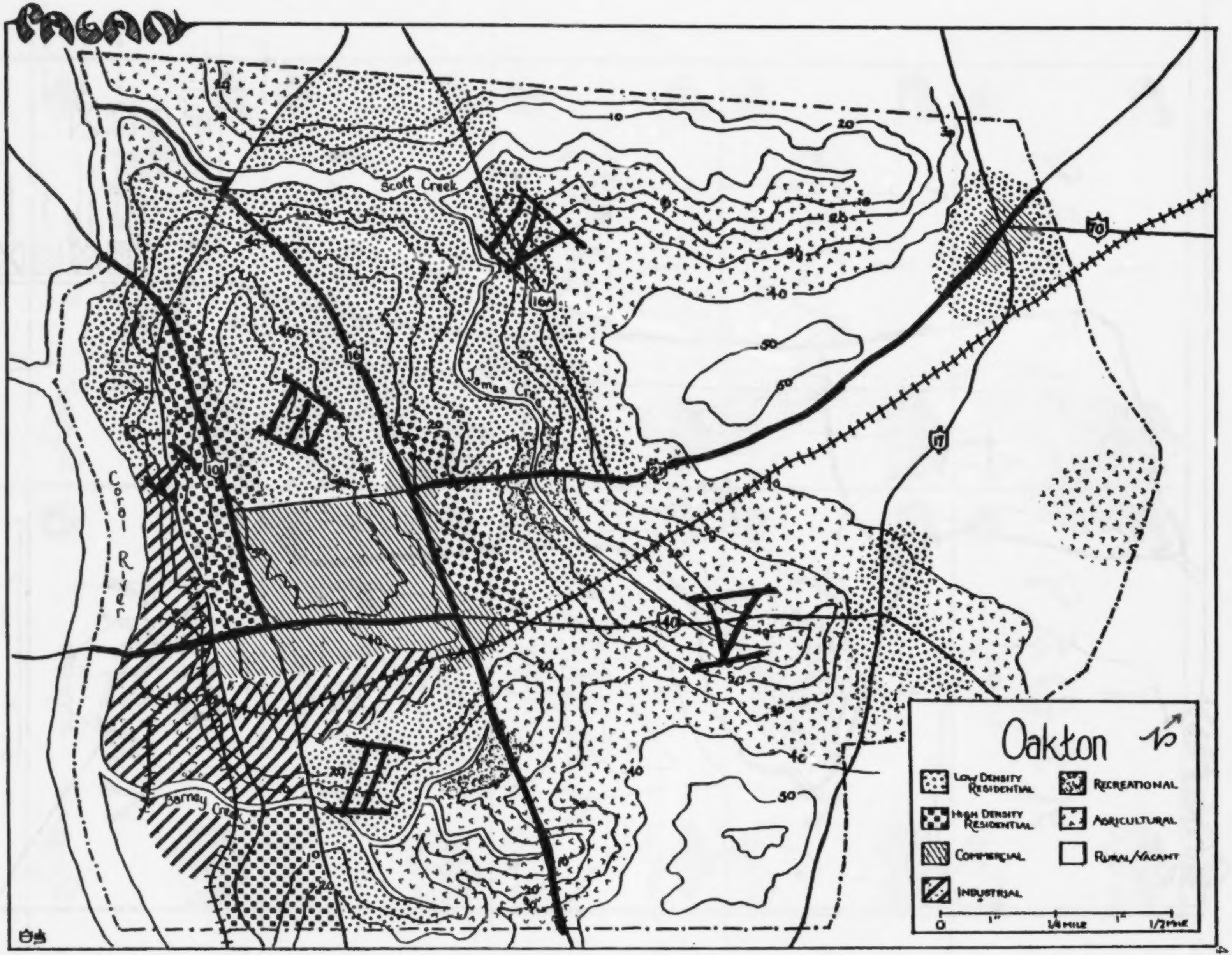
Use	Oakton Wards					Hamilton Beach Wards			Hampton County Towns				Total
Type	I	II	III	IV	V	I	II	III	A	B	C	D	
Lo Inc.	120	0	0	800	200	0	80	0	160	640	960	480	3440
Mid Inc.	160	320	720	400	200	160	200	80	160	960	320	800	4480
Hi Inc.	0	160	0	0	0	0	0	120	0	0	0	0	280
Bus. . .	160	440	240	40	80	120	0	0	0	200	0	0	1280
Conser.	0	40	0	40	80	0	0	160	160	120	120	240	960
Agric. .	0	0	0	640	640	0	0	0	11520	8960	0	0	21760
TOTAL .	440	960	960	1920	1200	280	280	360	19680	10880	1400	1520	32200

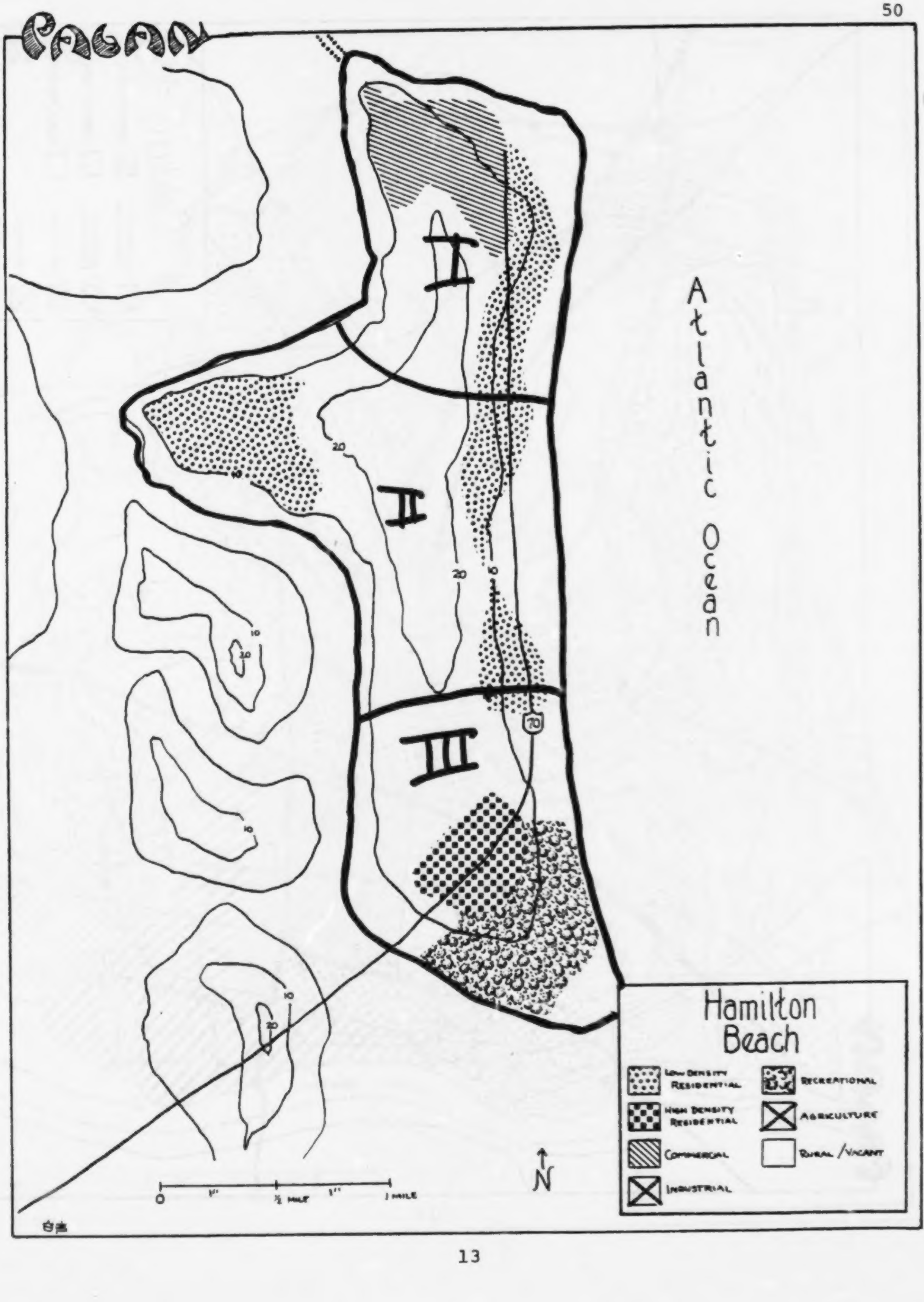
TABLE V. INTEREST GROUP POINTS ALLOCATION

City	Ward	Low Income	Mid Income	High Income	Business	Conserv.	Agric.	Total Points	No. Int. Groups	Elected Official
	Oakton-City-Ward-I	3	4	0	8	0	0	15	3	1
	II	0	8	4	22	1	0	35	4	1
	III	0	18	0	12	0	0	30	2	1
	IV	20	10	0	2	1	1	34	5	1
	V	5	5	0	4	2	1	17	5	1
	SubTotal	28	45	4	48	4	2	131	19	5
	Hampton-County-Anne	4	4	0	0	4	18	30	4	1
	Beauregard	16	24	0	10	3	14	67	5	1
	Charles	24	8	0	0	3	0	35	3	1
	Desmond	12	20	0	0	6	0	38	3	1
	Subtotal	56	56	0	10	16	32	170	15	4+2
	Hamilton-Beach-Ward-I	0	4	0	6	0	0	10	2	1
	II	2	5	0	0	0	0	7	2	1
	III	0	2	3	0	4	0	9	3	1
	Subtotal	2	11	3	6	4	0	26	7	3
	TOTAl	86	112	7	64	24	34	327	41	14

Residential and Conservation uses yield 1 point per 40 acres "owned".
Business uses yield 2 points per 40 acres "owned".
Agricultural uses yield 1 point per 640 acres "owned".


PAGAN
A
B
C
D
I
II
III
IV
V
VI
VII
Hampton Beach
Atlantic Ocean
Wilton
Dayton
Coral River
River
20
17
101
40
10A
70
10
20
30
40
County of Hampton
Low Density Residential
High Density Residential
Commercial
Industrial
Recreational
Agriculture
Rural/Vacant
0
1/2"
1
2
3
4
MILES
N


PAGAN
Oakton
N
LOW DENSITY RESIDENTIAL
HIGH DENSITY RESIDENTIAL
COMMERCIAL
INDUSTRIAL
RECREATIONAL
AGRICULTURAL
RURAL/VACANT
0
1"
1/4 MILE
1"
1/2 MILE
Scott Creek
James Creek
Barney Creek
Coral River
I
II
III
IV
V
70
17
25
16
16A
101
40
10
20
30
40
50


PAGAN
I
II
III
20
10
20
10
10
20
10
10
20
70
Atlantic Ocean
Hamilton Beach
Low Density Residential
High Density Residential
Commercial
Industrial
Recreational
Agriculture
Rural /Vacant
N
0
1"
½ mile
1"
1 mile

1
PAGAN
point

1
PAGAN
point

1
PAGAN
point

1
PAGAN
point

1
PAGAN
point

1
PAGAN
point

5
PAGAN
points

5
PAGAN
points

10
PAGAN
points

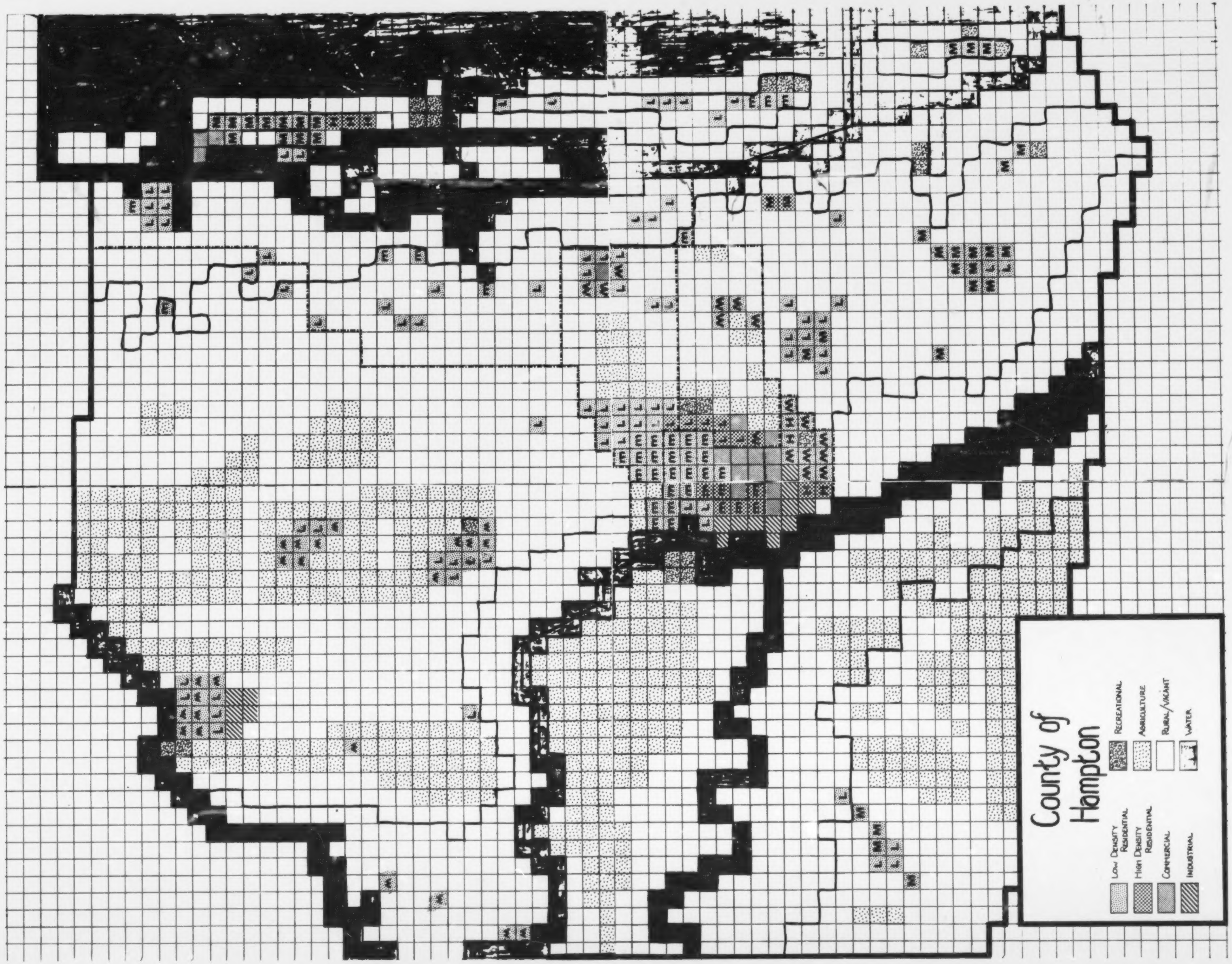
10
PAGAN
points

PAGAN

GAME

BOARD

(COASTAL)


County of Hampton
Low Density Residential
High Density Residential
Commercial
Industrial
Recreational
Agriculture
Rural/Vacant
Water

APPENDIX F

APPENDIX F

SAMPLE EVALUATION

Institute Participant

Please take a few minutes before leaving to fill out this questionnaire. Most of the questionnaire has been designed to be rapidly answered in check list format. Therefore, please don't be discouraged by its apparent lengthiness.

The final page you may tear off and take with you for return in the attached self-addressed stamped envelope, if you feel you'd like to take more time writing in comments. (If you want to complete the last page now as well, we'd be delighted.)

Thank you very much for your participation and help and have a pleasant trip home.

FLOOD HAZARD MANAGEMENT TRAINING INSTITUTE

INSTITUTE EVALUATION

1. The Regional Training Institute enabled me to: (please check the appropriate box)

	Strongly Agree	Agree	Uncert.	Disagree	Strongly Disagree
a. become better informed about the NFIP	☐	☐	☐	☐	☐
b. acquire more information regarding alternative flood hazard management strategies	☐	☐	☐	☐	☐
c. develop a better understanding of the nature of flood hazards	☐	☐	☐	☐	☐
d. develop a better understanding of the relationship between flood hazard management and natural resource protection	☐	☐	☐	☐	☐
e. establish contact with leaders of other commnities experiencing similar problems	☐	☐	☐	☐	☐
f. establish contact with individuals who could provide me with technical assistance	☐	☐	☐	☐	☐
g. develop a better understanding of the importance of public participation in community flood hazard decision-making	☐	☐	☐	☐	☐

	Strongly Agree	Agree	Uncert.	Disagree	Strongly Disagree
h. develop a better understanding of the techniques and tools to accomplish meaningful public participation	☐	☐	☐	☐	☐
i. develop a better understanding of the environmental, economic, social and political tradeoffs of various management strategies	☐	☐	☐	☐	☐

2. Which three institute activities do you feel were most valuable to you?

1 ________________________________

2 ________________________________

3 ________________________________

3. Which three institute activities were least valuable to you?

1 ________________________________

2 ________________________________

3 ________________________________

4. In general, how would you rate the following

	Excellent	Good	Fair	Poor	Comments
a. program structure (format, length, timing, variety)	☐	☐	☐	☐	
b. program content (breadth and depth of materials covered)	☐	☐	☐	☐	
c. mix of participants	☐	☐	☐	☐	

	Excellent	Good	Fair	Poor	Comments
d. speakers and panelists	☐	☐	☐	☐	
e. information	☐	☐	☐	☐	
f. overall quality	☐	☐	☐	☐	

5. Rate the Institute on the amount of time which was provided to meet your individual needs and how appropriately the time was used

	Much more time required	More time required	Just enough time	Less time required	Waste of time
Informal exchanges	☐	☐	☐	☐	☐
Breaks between sessions	☐	☐	☐	☐	☐
Questions & answer sessions	☐	☐	☐	☐	☐
Exercise/ relaxation/ free periods	☐	☐	☐	☐	☐
Socializing	☐	☐	☐	☐	☐
Making contacts	☐	☐	☐	☐	☐
Reviewing materials/ preparing for upcoming sessions	☐	☐	☐	☐	☐
Small group discussions	☐	☐	☐	☐	☐
Plenary sessions	☐	☐	☐	☐	☐
Institute overall	☐	☐	☐	☐	☐

This portion of the evaluation questionnaire may be returned in the attached self addressed envelope if you would prefer to take more time. But please mail it back.

Name ______________________________ (optional)

To assist you in writing your comments, a list of the various institute elements is presented below.

Day One

- Pre-Institute tutorial
- Flooding & flood hazard management (film/roundtable)
- Nature of Flooding and Role of Ecological Resources (workshops)
- Identifying natural and flood hazard data sources (workshops)
- state watershed meetings

Day Two

- Ideal flood hazard mitigation (roundtable)
- NFIP (roundtable)
- Role of local & state governments (roundtable)
- Role of public participation (speech)
- Effective public participation (case examples/small group discussions)
- Identifying opportunities and strategies (workshops)
- Second state watershed meetings

Day Three

- Designing a community program (simulation)
- Third state watershed meetings
- Report and critique of state plans
- Closing remarks

6. Which elements of the institute did you find most helpful and why?

____

____

7. Which elements of the institute did you find least helpful and why?

____

____

8. Do you believe involvement of groups and individuals like yourself can make a difference in the quality of a community flood hazard management program?

____

____

9. What important positive results, if any, do you feel will result from this institute?

____

____

10. We would appreciate your ideas about ways in which possible future institutes could be designed to be more effective.

____

____

APPENDIX G

MODEL STUDENT MANUAL: RIVERINE

FLOOD HAZARD MANAGEMENT

AND

NATURAL RESOURCE PROTECTION

MODEL RIVERINE STUDENT MANUAL*

Prepared by
The Conservation Foundation
Washington, D.C.

For
The Federal Emergency Management Agency

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* This manual is based on the model training program developed by The Conservation Foundation. It should not be produced as is--but should be revised for each Institute to reflect any changes made to CF's model.

BACKGROUND

This training program on Flood Hazard Management and Natural Resource Protection was developed by The Conservation Foundation for The Federal Emergency Management Agency. The program has been designed for local officials and citizen leaders as a means to increase their knowledge of:

- the basic requirements of the National Flood Insurance Program;
- the ways in which ecological and hazard mitigation requirements come together in establishing principles for physical management of the flood-prone areas;
- economic and social coincidences of interest and conflicts with flood management goals; and
- the various other federal, state, and local programs that come together on the floodplain and that could potentially lead toward more effective implementation of a community flood management program and natural resource protection program.

In addition, the program is intended to focus the attention of community leaders on means to disseminate the information provided in the training program throughout their community.

Those of you who are participating in the training institute for which this workbook has been prepared come from communities who face flood problems. You have been invited to participate in this program because you hold a leadership position in your community and are in a position to influence community flood hazard mitigation decisions.

It is our hope that this institute will provide you with an increased awareness of flood hazards, alternative management approaches, and methods for increasing public involvement in these key community resource decisions.

INSTITUTE SPONSORS

FEDERAL EMERGENCY MANAGEMENT AGENCY

FEMA is a new federal agency (created in March 31, 1979) responsible for the coordination of federal hazard mitigation efforts. The agency's specific responsibilities include overseeing key emergency programs in dam safety, emergency warning systems and severe weather warnings, as well as disaster relief and community flood hazard mitigation through the National Flood Insurance Program. The central office, Training and Education Division of FEMA has provided the funding for this institute as part of a program of increased technical assistance to communities.

THE CONSERVATION FOUNDATION

Through research, citizen training and communication with opinion leaders in the United States and abroad, The Conservation Foundation encourages wise management of the earth's resources -- its land, water, energy, air. A nonprofit organization, The Conservation Foundation designed and directed the training program of which this Institute is a part.

REGIONAL COORDINATOR

HOW TO USE THE INSTITUTE WORKBOOK

This Workbook is designed to be the principal companion of each participant attending the Community Flood Hazard Mitigation Training Institute. It contains the detailed information needed to conduct each part of the Institute program. The Program in Brief acts as a table of contents for the remainder of the book. The remainder of the workbook is organized by program element, and each program element is followed by whatever discussion questions, exercises and case example material may be necessary to work through that part of the training program.

Other materials prepared for your use by The Conservation Foundation include: "Flood Hazard Management and Natural Resource Protection: Community Action Guide" and "Community Action Guide Summary." The Training Manual contains seven separate chapters that outline in some detail the essential components of a community flood hazard mitigation and resource protection program highlighting the legal, environmental, social, and political factors that affect these decisions. The manual discusses further federal flood hazard mitigation initiatives. Particular attention is given to the NFIP and community responsibilities under that program.

The chapters in the Training Manual are organized to both be read as a book and to address single essential questions that could arise during a community's flood hazard mitigation planning process. If you examine the table of contents for each chapter, you may find areas you would like to read while at the training institute. The manual is designed for yor use when you return home, however. We hope that it will assist you in understanding the nature of the complex decisions that must be made to achieve flood hazard mitigation and allow you to raise the questions necessary to affect your community's choice of mitigation approaches.

The Community Action Guide Summary was mailed to you before the insititute and is designed for your use before and during the Institute and in conducting public involvement activities when you return home. It summarizes the larger guidebook, outlines the goals of effective public participation, and appropriate public participation mechanisms. We hope you will take the opportunity to read through this booklet while at the Institute, as it should be particularly helpful to you in outlining follow-up activities.

PROGRAM IN BRIEF

DAY ONE Page

11:00 - 1:00 REGISTRATION

Briefing for Discussion Leaders

Location:

1:00 - 1:30 WELCOME AND INTRODUCTION

Speakers:

Location:

1:30 - 2:15 INTRODUCTION OF PARTICIPANTS

Discussion Leader:

Location:

2:30 - 4:00 FLOODING AND FLOOD HAZARD MANAGEMENT IN RIVERINE AREAS: AN OVERVIEW

Panel Members:

Location:

4:00 - 4:45 ESTABLISHING THE GOALS OF COMMUNITY FLOOD HAZARD MANAGEMENT

Discussion Leader:

Location:

5:00 - 6:00 SOCIAL HOUR

Location:

DAY ONE (continued)		Page
6:00 - 7:30	DINNER	
	Location:	
7:30 - 9:00	THE NATURE OF FLOODING IN COASTAL COMMUNITIES AND THE SPECIAL ROLE OF COASTAL ECOLOGICAL RESOURCES IN FLOOD HAZARD MITIGATION	
	Discussion Leaders:	
	Locations:	
DAY TWO		
8:30 - 8:45	FLOOD HAZARD MANAGEMENT: THREE STORIES	
	Location:	
8:45 - 9:30	DESIGNING A FLOOD HAZARD MANAGEMENT PROGRAM: IDENTIFYING GOALS OPPORTUNITIES AND STRATEGIES	
	Location:	
9:30 - 10:45	THE FEDERAL AND STATE FRAMEWORK FOR COMMUNITY FLOOD HAZARD DECISION-MAKING	
	Speaker:	
	Panel Members:	
	Location:	
11:00 - 12:15	THE NATIONAL FLOOD INSURANCE PROGRAM: WHAT IT DOES AND DOESN'T DO	
	Speaker:	
	Panel Members:	
	Location:	

DAY TWO (continued) Page

12:15 - 1:30 LUNCH

1:30 - 2:30 FLOOD HAZARD MANAGEMENT: ISSUES AND PROGRAMS

Discussion Leaders:

Location:

2:45 - 3:45 LOCAL STRATEGIES FOR FLOOD HAZARD MITIGATION: CASE EXAMPLES

Discussion Leaders:

Locations:

4:00 - 5:00 THE ROLE OF PUBLIC PARTICIPATION IN COMMUNITY FLOOD HAZARD DECISION-MAKING

Speaker:

Location:

6:30 - 7:00 DINNER

Location:

7:30 - 9:00 RECOMMENDATIONS FOR GROUP ACTION

Discussion Leaders:

Location:

DAY THREE

8:30 - 9:30 ISSUES IN PUBLIC PARTICIPATION

Discussion Leaders:

Location:

DAY THREE (continued) **Page**

10:00 - 12:00	DESIGNING A FLOOD HAZARD MANAGEMENT PROGRAM IN RIVERINE COMMUNITIES Discussion Leaders: Locations:
12:00 - 1:30	LUNCH Location:
1:30 - 3:00	FINAL SMALL GROUP DISCUSSIONS Discussion Leaders: Location:
3:30 - 4:30	CONCLUSION Speaker: Location:

MODEL RIVERINE STUDENT MANU

WORKSHOP ON FLOOD HAZARD MANAGEMENT

RESOURCE PROTECTION: THE RIVERINE

DAY ONE

11:00 - 1:00 p.m. REGISTRATION

1:00 p.m. WELCOME

Purpose:

- To establish the majo
the Conference.
- To introduce key staf
people.
- To orient group to se
session, time schedul
and administrative an

Activity:

- Plenary session speak

NOTES:

1:30 - 2:15 INTRODUCTION OF PARTICIPANTS

Purpose:

- To introduce community participants and their communities to one another.
- To establish the function of the working group at the conference.

Activity:

- Small group discussion sessions within plenary room.

NOTES:

2:30 - 4:30 p.m. FLOODING AND FLOOD HAZARD MANAGEMENT IN RIVERINE AREAS: AN OVERVIEW

Purpose:

- Create participant understanding of inherent complexities of riverine flood hazard management.
- To give an historical perspective to riverine flood hazard management.
- To address changing directins in coastal flood hazard management in response to the perceived weaknesses of the traditional approach.

Activities:

- Film
- Reaction Panel Discussion
- Audience Questions and Answers

Review Questions

1. What are the special problems of protecting the riverine floodplain? (Dynamic nature of riverine floodplain, fragility of riverine ecosystem.)
2. What is the relationship of watershed and drainage management to riverine flooding problems?
3. What are some of the economic and social factors which contribute to the development of floodplains?
4. What are the weaknesses of traditional approaches to riverine flood hazard management?

5. What are the changing directions in our current approach to riverine flood hazard management?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapters I and II.

NOTES:

4:00 - 4:45 p.m.

ESTABLISHING THE GOALS OF COMMUNITY FLOOD HAZARD MANAGEMENT

Purpose:

- To assist participants in establishing the target goals for which they will develop strategies.
- To introduce participants to each other by helping them appreciate the different perspectives with which they approach flood hazard management.

Activities:

- Exercise on Goals (Exercise A attached)
- Group Discussion

Review Questions

1. What are the most important goals to consider in developing a community flood hazard management program?
2. How do various interest groups differ in their assessment of goals?
3. How can or should other community goals be integrated with flood hazard management goals?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapter III.

NOTES:

Exercise A

Goals for Community Flood Hazard Management

Of the goals listed below, which do you feel are the four most important to accomplish in developing a community flood hazard management program?

Rank/Goals

____ 1 Minimize fiscal impact of floods.

____ 2 Reduce erosion and sedimentations.

____ 3 Reduce property loss.

____ 4 Preserve natural areas.

____ 5 Protect safety of population.

____ 6 Reduce flood damage to public property.

____ 7 Distribute management costs fairly.

____ 8 Preserve open space and recreation.

____ 9 Maintain good water quality.

____ 10 Encourage economic development.

Which of the following categories of interest groups do you most closely identify with?

____ 1 Local officials.

____ 2 State officials.

____ 3 Floodplain resident.

____ 4 Local businessman (economic interests).

____ 5 Environmentalists.

____ 6 Civic group member (Red Cross, church group).

4:30 p.m. BREAK

5:00 p.m. SOCIAL HOUR

6:00 p.m. DINNER

7:30 - 9:00 p.m. THE NATURE OF FLOODING IN RIVERINE COMMUNITIES AND THE SPECIAL ROLE OF RIVERINE ECOLOGICAL RESOURCES IN FLOOD HAZARD MITIGATION

Purpose:

- To assist participants in identifying and understanding the causes of flooding and the nature of flood hazards in their community.
- To help participants understand the functioning of important riverine ecosystems for hazard mitigation purposes.
- To familiarize participants with various uses of natural resource data and maps as community planning and decision-making tools.

Activities:

- Six to eight concurrent small group sessions which discuss the special ecological characteristics of riverine systems.
- Land Use Suitability Analysis--Mapping Exercise

Review Questions

1. What are the special ecological areas commonly found within river corridors?
2. Where, within the river corridor, do they commonly occur? In what associations?
3. What role do each of these resources play in flood hazard mitigation?

4. How sensitive are these resources to the activities of man?
5. How can these resources be protected? What management policies should be applied?
6. What is a meant by land suitability analysis?
7. How does such an analysis help identify flood hazard mitigation/resource protection opportunities?
8. What role does resource mapping play in this analysis?
9. What type of resource and maps exist or may be available for my community? From what sources?
10. What environmental factors or values are most important in my community?
11. What is suitable map base on which to represent these factors?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapter II.

NOTES:

IDENTIFYING NATURAL RESOURCE AND FLOOD HAZARD DATA SOURCES FOR DECISION-MAKING

WORKSHOP MATERIALS

BASE MAPS [1]

There are three categories of base maps: planimetric, topographic, and orthophoto.

A planimetric map shows roads, structures, political boundaries, and waterways, etc. in two dimensions. It illustrates horizontal positioning, not the height of hills or valleys.

A photogrammetric planimetric map is a planimetric map which has been prepared from aerial photographs and has been corrected so that horizontal measurements taken from the map accurately reflect the distance on the ground within a certain tolerance.

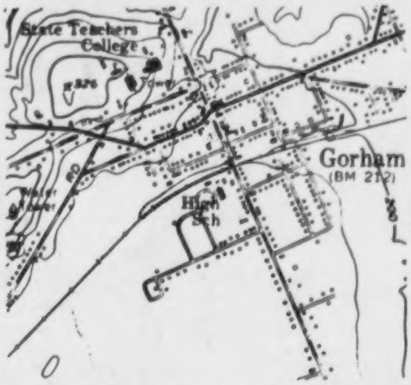
A topographic map shows the type of information illustrated on a planimetric map plus it has contour lines to show hills and valleys of the land, drainage patterns and the steepness of slopes.

A photogrammetric topographic map is a topographic map which has been prepared from aerial photographs and has been corrected so that both horizontal and vertical measurements taken from the map accurately reflect the distances and elevations on the ground within a certain tolerance.

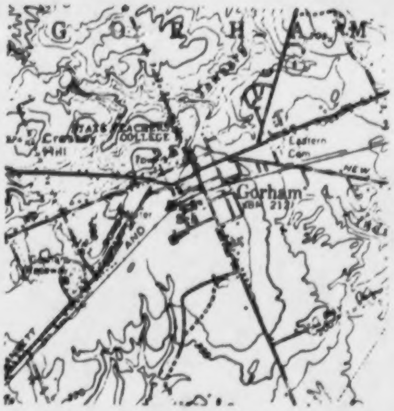
An orthophoto map is a map composed of a corrected aerial photograph on which features such as road names, place names, property boundaries, and political boundaries have been added. All the features which appear on an aerial photograph also appear on an orthophoto map.

MAP SCALE [2]

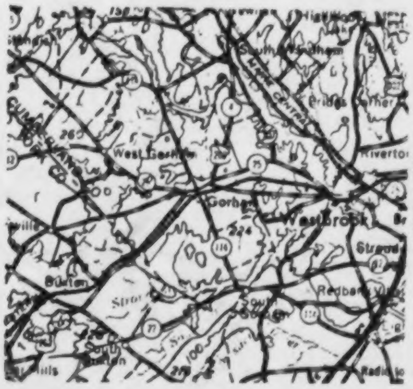
Map scale defines the relationship between the measurements of the features as shown on the map and as they exist on the Earth's surface. Scale is generally stated as a ratio or fraction —



1:24,000 scale, 1 inch = 2,000 feet. Area shown, 1 square mile.



1:62,500 scale, 1 inch = about 1 mile. Area shown, 6¾ square miles



1:250,000 scale, 1 inch = about 4 miles. Area shown, 107 square miles

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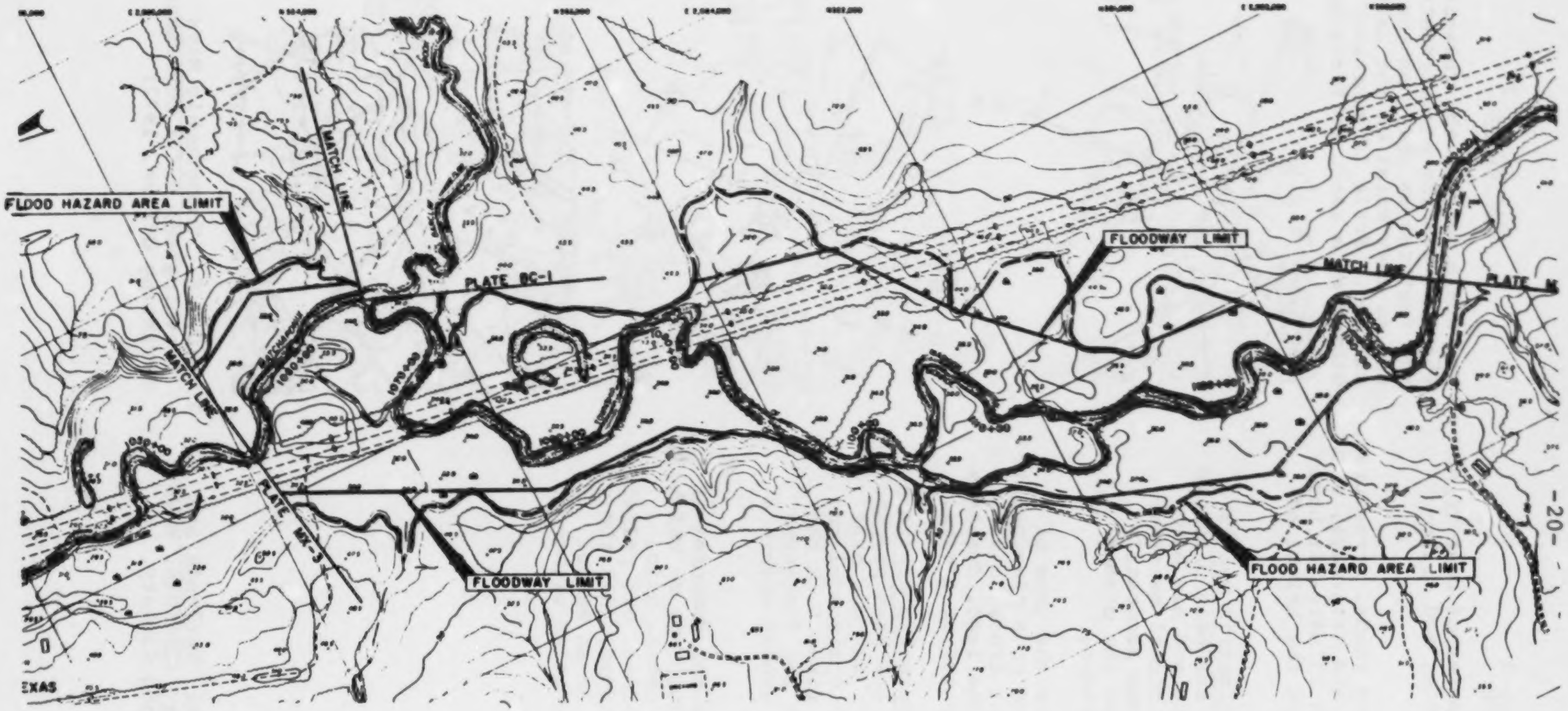
1. Barbara Maire et. al, Wetlands and Floodplains on Paper (Lincoln, Mass.: Massachusetts Audubon Society, undated)

2. U.S.G.S., Topographic Maps (Washington, D.C.: Government Printing Office, 1972)

FLOODPLAIN DELINEATION ON A PHOTOGRAMMETRIC TOPOGRAPHIC MAP


FLOOD HAZARD AREA LIMIT
MATCH LINE
PLATE BC-1
FLOODWAY LIMIT
MATCH LINE
PLATE MX-
MATCH LINE
PLATE MX-3
FLOODWAY LIMIT
FLOOD HAZARD AREA LIMIT
MATCHAPONIX
1030+00
1040+00
1070+00
1090+00
EXAS

PLAN

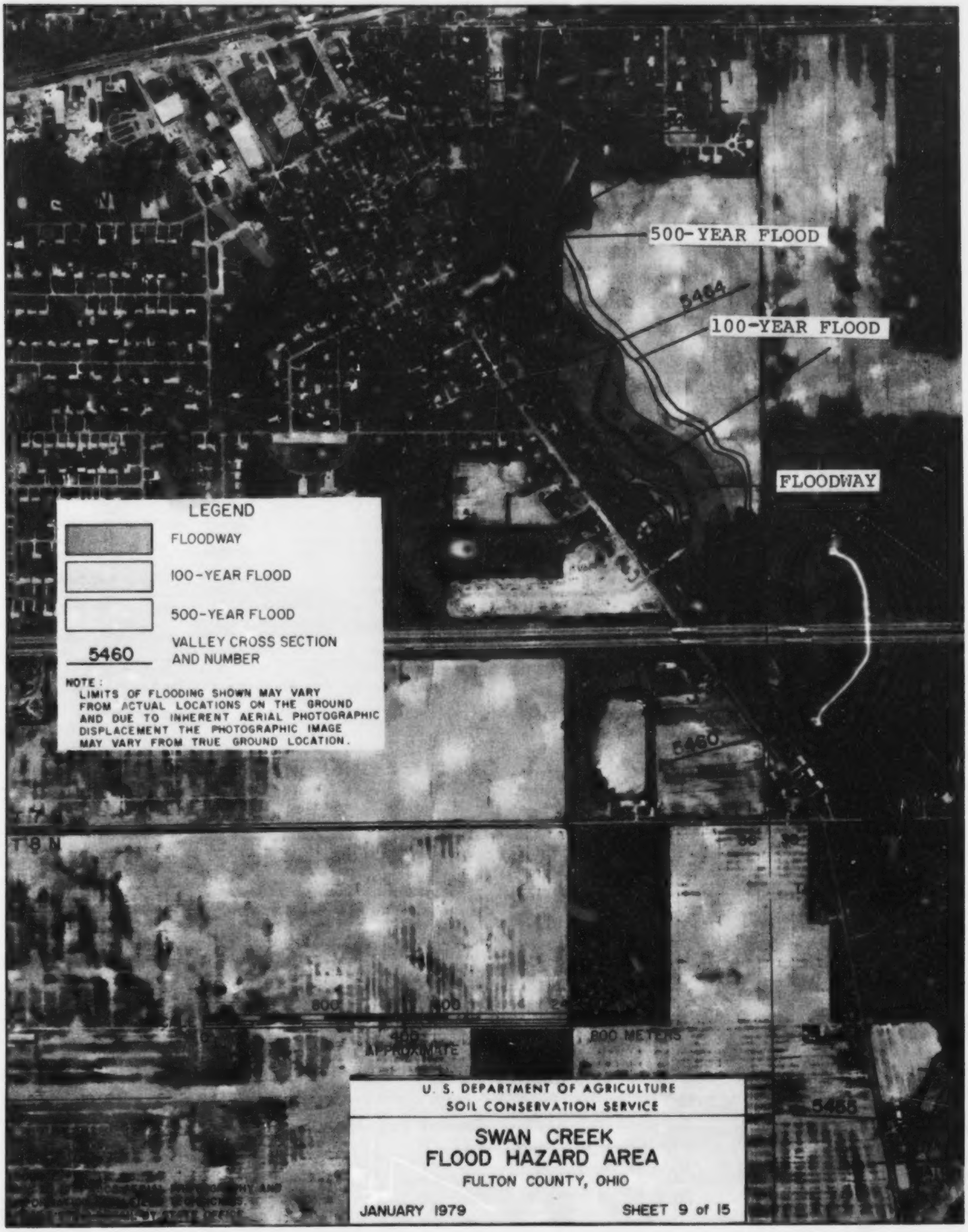
200 0 200 400 600
SCALE IN FEET

STATE OF NEW JERSEY
DEPARTMENT of CONSERVATION
&
ECONOMIC DEVELOPMENT
DIVISION of WATER POLICY and SUPPLY
DELINEATION OF FLOODWAY
AND FLOOD HAZARD AREA
MATCHAPONIX BROOK
STA.1030+00 TO STA.1130+00
MADISON TOWNSHIP, MONROE TOWNSHIP
Middlesex County, New Jersey

Anderson-Nichols & Co.
Boston, Mass.

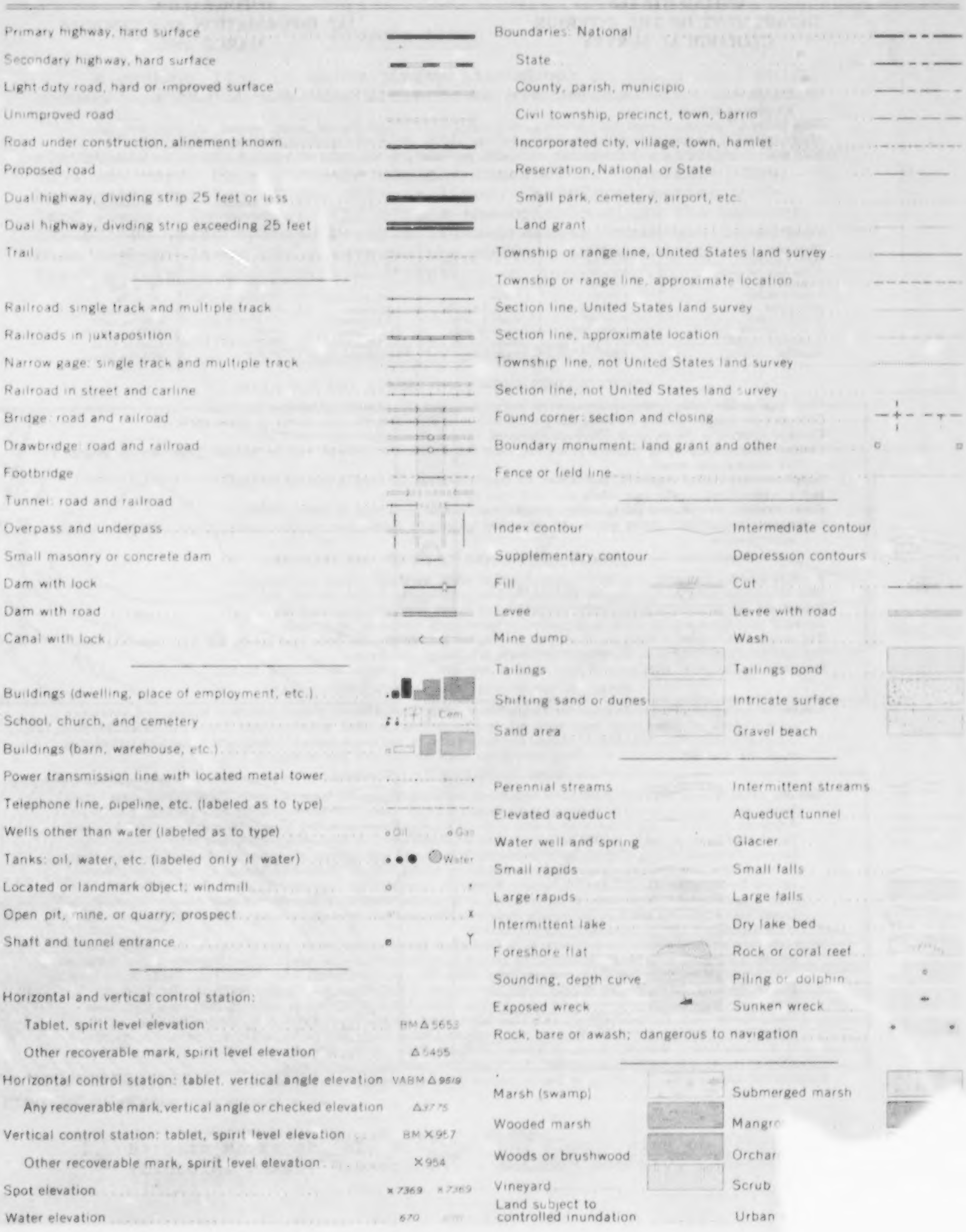
PLATE MX-4

FLOODPLAIN DELINEATION ON AN ORTHOPHOTO MAP


500-YEAR FLOOD
5464
100-YEAR FLOOD
FLOODWAY
LEGEND
▨ FLOODWAY
☐ 100-YEAR FLOOD
☐ 500-YEAR FLOOD
5460 VALLEY CROSS SECTION AND NUMBER
NOTE:
LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.
5460
T 8 N
400
APPROXIMATE
800 METERS
5456
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
SWAN CREEK
FLOOD HAZARD AREA
FULTON COUNTY, OHIO
JANUARY 1979
SHEET 9 of 15

TOPOGRAPHIC MAP SYMBOLS

VARIATIONS WILL BE FOUND ON OLDER MAPS



Primary highway, hard surface
Secondary highway, hard surface
Light duty road, hard or improved surface
Unimproved road
Road under construction, alinement known
Proposed road
Dual highway, dividing strip 25 feet or less
Dual highway, dividing strip exceeding 25 feet
Trail

Railroad: single track and multiple track
Railroads in juxtaposition
Narrow gage: single track and multiple track
Railroad in street and carline
Bridge: road and railroad
Drawbridge: road and railroad
Footbridge
Tunnel: road and railroad
Overpass and underpass
Small masonry or concrete dam
Dam with lock
Dam with road
Canal with lock

Buildings (dwelling, place of employment, etc.)
School, church, and cemetery
Buildings (barn, warehouse, etc.)
Power transmission line with located metal tower
Telephone line, pipeline, etc. (labeled as to type)
Wells other than water (labeled as to type)
Tanks: oil, water, etc. (labeled only if water)
Located or landmark object; windmill
Open pit, mine, or quarry; prospect
Shaft and tunnel entrance

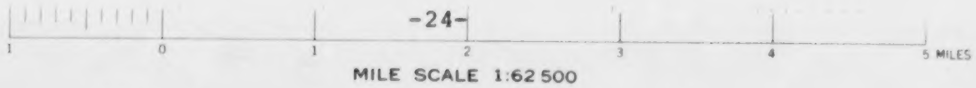
Horizontal and vertical control station:
Tablet, spirit level elevation
Other recoverable mark, spirit level elevation
Horizontal control station: tablet, vertical angle elevation
Any recoverable mark, vertical angle or checked elevation
Vertical control station: tablet, spirit level elevation
Other recoverable mark, spirit level elevation
Spot elevation
Water elevation

Boundaries: National
State
County, parish, municipio
Civil township, precinct, town, barrio
Incorporated city, village, town, hamlet
Reservation, National or State
Small park, cemetery, airport, etc.
Land grant
Township or range line, United States land survey
Township or range line, approximate location
Section line, United States land survey
Section line, approximate location
Township line, not United States land survey
Section line, not United States land survey
Found corner: section and closing
Boundary monument: land grant and other
Fence or field line

Index contour — Intermediate contour
Supplementary contour — Depression contours
Fill — Cut
Levee — Levee with road
Mine dump — Wash
Tailings — Tailings pond
Shifting sand or dunes — Intricate surface
Sand area — Gravel beach

Perennial streams — Intermittent streams
Elevated aqueduct — Aqueduct tunnel
Water well and spring — Glacier
Small rapids — Small falls
Large rapids — Large falls
Intermittent lake — Dry lake bed
Foreshore flat — Rock or coral reef
Sounding, depth curve — Piling or dolphin
Exposed wreck — Sunken wreck
Rock, bare or awash; dangerous to navigation

Marsh (swamp) — Submerged marsh
Wooded marsh — Mangro
Woods or brushwood — Orchar
Vineyard — Scrub
Land subject to controlled inundation — Urban



2 MILES
1
0
MILE SCALE 1:24 000

1000
0
5000
10000
15000 FEET
FOOT SCALE 1:24 000

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

TOPOGRAPHIC
MAP INFORMATION AND SYMBOLS
MARCH 1978

QUADRANGLE MAPS AND SERIES

Quadrangle maps cover four-sided areas bounded by parallels of latitude and meridians of longitude. Quadrangle size is given in minutes or degrees.

Map series are groups of maps that conform to established specifications for size, scale, content, and other elements.

Map scale is the relationship between distance on a map and the corresponding distance on the ground.

Map scale is expressed as a numerical ratio and shown graphically by bar scales marked in feet, miles, and kilometers.

NATIONAL TOPOGRAPHIC MAPS

Series	Scale	1 inch represents	1 centimeter represents	Standard quadrangle size (latitude-longitude)	Quadrangle area (square miles)
7½-minute	1:24,000	2,000 feet	240 meters	7½× 7½ min.	49 to 70
7½× 15-minute	1:25,000	about 2,083 feet	250 meters	7½× 15 min.	98 to 140
Puerto Rico 7½-minute	1:20,000	about 1,667 feet	200 meters	7½× 7½ min.	71
15-minute	1:62,500	nearly 1 mile	625 meters	15× 15 min.	197 to 282
Alaska 1:63,360	1:63,360	1 mile	nearly 634 meters	15× 20 to 36 min.	207 to 281
Intermediate	1:100,000	nearly 1.6 miles	1 kilometer	30× 60 min.	1568 to 2240
U. S. 1:250,000	1:250,000	nearly 4 miles	2.5 kilometers	1°× 2° or 3°	4,580 to 8,669
U. S. 1:1,000,000	1:1,000,000	nearly 16 miles	10 kilometers	4°× 6°	73,734 to 102,759
Antarctica 1:250,000	1:250,000	nearly 4 miles	2.5 kilometers	1°× 3° to 15°	4,089 to 8,336
Antarctica 1:500,000	1:500,000	nearly 8 miles	5 kilometers	2°× 7½°	28,174 to 30,462

CONTOUR LINES SHOW LAND SHAPES AND ELEVATION

The shape of the land, portrayed by contours, is the distinctive characteristic of topographic maps.

Contours are imaginary lines following the ground surface at a constant elevation above or below sea level.

Contour interval is the elevation difference represented by adjacent contour lines on maps.

Contour intervals depend on ground slope and map scale. Small contour intervals are used for flat areas; larger intervals are used for mountainous terrain.

Supplementary dotted contours, at less than the regular interval, are used in selected flat areas.

Index contours are heavier than others and most have elevation figures.

Relief shading, an overprint giving a three-dimensional impression, is used on selected maps.

Orthophotomaps, which depict terrain and other map features by color-enhanced photographic images, are available for selected areas.

COLORS DISTINGUISH KINDS OF MAP FEATURES

Black is used for manmade or cultural features, such as roads, buildings, names, and boundaries.

Blue is used for water or hydrographic features, such as lakes, rivers, canals, glaciers, and swamps.

Brown is used for relief or hypsographic features—land shapes portrayed by contour lines.

Green is used for woodland cover, with patterns to show scrub, vineyards, or orchards.

Red emphasizes important roads and is used to show public land subdivision lines, land grants, and fence and field lines.

Red tint indicates urban areas, in which only landmark buildings are shown.

Purple is used to show office revision from aerial photographs. The changes are not field checked.

INDEXES SHOW PUBLISHED TOPOGRAPHIC MAPS

Indexes for each State, Puerto Rico and the Virgin Islands of the United States, Guam, American Samoa, and Antarctica show available published maps. Index maps show quadrangle location, name, and survey date. Listed also are special maps and sheets, with prices, map dealers, Federal distribution centers, and map reference libraries, and instructions for ordering maps. Indexes and a booklet describing topographic maps are available free on request.

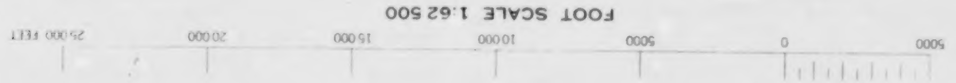
HOW MAPS CAN BE OBTAINED

Mail orders for maps of areas east of the Mississippi River, including Minnesota, Puerto Rico, the Virgin Islands of the United States, and Antarctica should be addressed to the Branch of Distribution, U. S. Geological Survey, 1200 South Eads Street, Arlington, Virginia 22202. Maps of areas west of the Mississippi River, including Alaska, Hawaii, Louisiana, American Samoa, and Guam should be ordered from the Branch of Distribution, U. S. Geological Survey, Box 25286, Federal Center, Denver, Colorado 80225. A single order combining both eastern and western maps may be placed with either office. Residents of Alaska may order Alaska maps or an index for Alaska from the Distribution Section, U. S. Geological Survey, Federal Building-Box 12, 101 Twelfth Avenue, Fairbanks, Alaska 99701. Order by map name, State, and series. On an order amounting to $300 or more at the list price, a 30-percent discount is allowed. No other discount is applicable. Prepayment is required and must accompany each order. Payment may be made by money order or check payable to the U. S. Geological Survey. Your ZIP code is required.

Sales counters are maintained in the following U. S. Geological Survey offices, where maps of the area may be purchased in person: 1200 South Eads Street, Arlington, Va.; Room 1028, General Services Administration Building, 19th & F Streets NW, Washington, D. C.; 1400 Independence Road, Rolla, Mo.; 345 Middlefield Road, Menlo Park, Calif.; Room 7638, Federal Building, 300 North Los Angeles Street, Los Angeles, Calif.; Room 504, Custom House, 555 Battery Street, San Francisco, Calif.; Building 41, Federal Center, Denver, Colo.; Room 1012, Federal Building, 1961 Stout Street, Denver Colo.; Room 1C45, Federal Building, 1100 Commerce Street, Dallas, Texas; Room 8105, Federal Building, 125 South State Street, Salt Lake City, Utah; Room 1C402, National Center, 12201 Sunrise Valley Drive, Reston, Va.; Room 678, U. S. Court House, West 920 Riverside Avenue, Spokane, Wash.; Room 108, Skyline Building, 508 Second Avenue, Anchorage, Alaska; and Federal Building, 101 Twelfth Avenue, Fairbanks, Alaska.

Commercial dealers sell U. S. Geological Survey maps at their own prices. Names and addresses of dealers are listed in each State index.

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1978

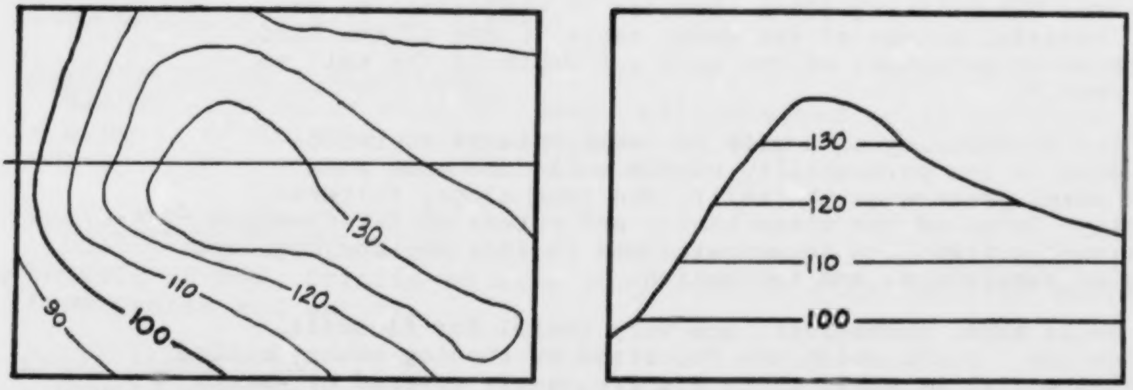


CONTOUR LINES

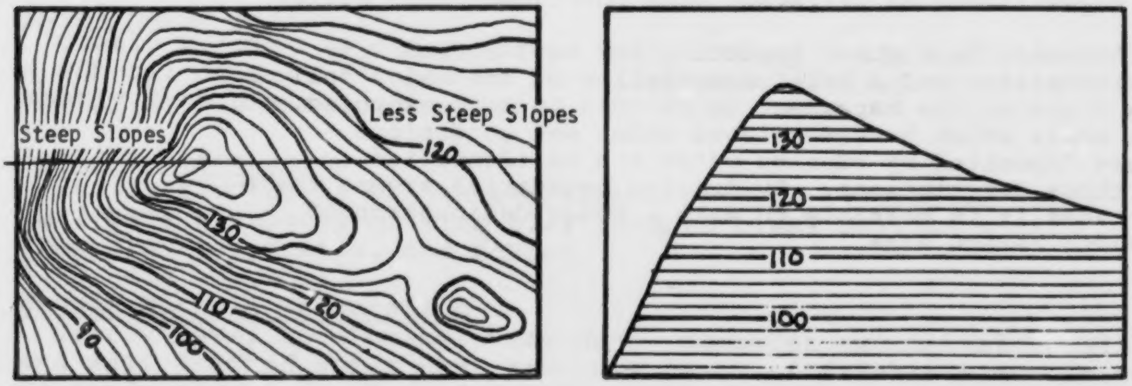
A contour line is an imaginery line drawn on the ground which connects points of the same altitude or elevation.

The contour interval is the vertical distance (difference in elevation) separating contour lines. While contour intervals between maps may vary, on any single map the interval is constant. The horizontal spacing of the contour lines, therefore, varies with land slope. In general, the closer the contour lines the steeper the slope. Wide spacing between lines indicates more gentle slopes. When contour lines cross streams the contour is bent into a V, the V points in the upstream direction.

COMPARISON OF CONTOUR INTERVALS [1]


130
110
120
90
100
130
120
110
100

10' CONTOUR INTERVAL.


Less Steep Slopes
Steep Slopes
120
130
110
120
90
100
130
120
110
100

2' CONTOUR INTERVAL.

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1. Barbara Maire et. al, Wetlands and Floodplains on Paper (Lincoln, Mass.: Massachusetts Audubon Society, undated)

THE SOIL SURVEY

Man is dependent on soils. Soils provide the habitat for plants and crops; the foundations for buildings and roads; and receptacles for domestic, municipal, industrial and animal wastes. Soil management should be a fundamental planning concern and the soil survey is an essential planning tool. The soil survey, conducted by the Soil Conservation Service, provides the basic information needed for planning including: a map depicting different soil types and a description of the properties and limitations of these soils.

Of particular interest for land use planning are the soil's "engineering properties" and "engineering interpretations." These interpretations indicate the suitability of areas for different uses. For example, the suitability of areas for homebuilding sites involves an evaluation of the flood hazards, height of the water table, slope of the land, shrink-swell potential of the soil and depth of the soil to hard rock.[1]

The suitability of a site for septic tanks is rated according to the permeability of the soil (the ease with which water penetrates the soil), the land slope, filtering capacity, level of the water table, and potential for flooding.[2] Additional suitability interpretations include use for highways, ponds or reservoirs, and recreation.

Soils maps, themselves, are very useful for floodplain delineation. Soils which are deposited by running water (called alluvial soils) or soils which are frequently covered by water differ in texture, color, or structure from those which develop under drier conditions. Such soils will, therefore, have classifications different from non-flood-prone soils.

Attached is a chart depicting the soil suitability interpretations and a brief description of the major soil types found on the map sheet to be used in this exercise. Those soils which have developed under wet conditions or were deposited by running water can be identified from these descriptions. By drawing boundaries around these soil types it is possible to make a rough delineation of the flood hazard area.

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1. U.S. Department of Agriculture, Soil Conservation Service, Soil Survey For Wake County, North Carolina. (Washington, D.C.: GPO, 1970)

2. Ibid.

SOIL ASSOCIATION

Creedmore-White Store Association
Gently sloping to hilly, deep and moderately deep, moderately well drained soild that have a very firm clayey subsoil; derived from sandstone, shale, and mudstone.

Mayodan-Granville-Creedmoor Association
Gently sloping to moderately steep, deep or moderately deep, well drained and moderately well drained soils that have a subsoil of friable sandy clay loam to very firm clay; derived from sandstone, shale, and mudstone.

Herndon-Georgeville Association
Gently sloping to moderately steep, deep, well-drained soils that have a subsoil of friable silty clay loam to clay; derived from phyllite (Carolina slates).

Appling-Durham Association
Gently sloping to sloping, deep, well-drained soils that have a subsoil of friable sandy clay loam to firm clay; derived mostly from granite, gneiss, and schist.

Cecil-Appling Association
Gently sloping to steep, deep, well-drained soils that have a subsoil of red, friable to firm clay loam to clay; derived mostly from gneiss and schist.

Cecil Association
Gently sloping to steep, deep, well-drained soils that have a subsoil of firm red clay; derived mostly from gneiss and schist.

Cecil-Madison Association
Gently sloping to steep, deep, well-drained soils that have a subsoil of red, friable to firm clay loam to clay; derived mostly from gneiss and schist.

Appling Association
Gently sloping to moderately steep, deep, well-drained soils that have a subsoil of firm clay loam to clay; derived mostly from granite, gneiss, and schist.

Wagram-Norfolk Association
Nearly level to sloping, very deep, somewhat excessively drained and well drained soils that have a subsoil of friable sandy loam to sandy clay loam; formed in Coastal Plain sediments.

Appling-Louisburg-Wedowee Association
Gently sloping to steep, deep and moderately deep, well drained and somewhat excessively drained soild that have a subsoil of very friable coarse sandy loam to firm clay; derived mostly from granite, gneiss, and schist.

KEY

Map symbol	Mapping unit
AfA	Altavista fine sandy loam, 0 to 4 percent slopes-
AgB	Appling gravelly sandy loam, 2 to 6 percent slopes
AgB2	Appling gravelly sandy loam, 2 to 6 percent slopes, eroded
AgC	Appling gravelly sandy loam, 6 to 10 percent slopes
AgC2	Appling gravelly sandy loam, 6 to 10 percent slopes, eroded
ApB	Appling sandy loam, 2 to 6 percent slopes
ApB2	Appling sandy loam, 2 to 6 percent slopes, eroded
ApC	Appling sandy loam, 6 to 10 percent slopes
ApC2	Appling sandy loam, 6 to 10 percent slopes, eroded
ApD	Appling sandy loam, 10 to 15 percent slopes
AsB	Appling fine sandy loam, 2 to 6 percent slopes
AsB2	Appling fine sandy loam, 2 to 6 percent slopes, eroded
AsC	Appling fine sandy loam, 6 to 10 percent slopes
AsC2	Appling fine sandy loam, 6 to 10 percent slopes, eroded
Au	Augusta fine sandy loam
(1/)	Borrow area
Bu	Buncombe soils
CeB	Cecil sandy loam, 2 to 6 percent slopes
CeB2	Cecil sandy loam, 2 to 6 percent slopes, eroded
CeC	Cecil sandy loam, 6 to 10 percent slopes
CeC2	Cecil sandy loam, 6 to 10 percent slopes, eroded
CeD	Cecil sandy loam, 10 to 15 percent slopes
CeF	Cecil sandy loam, 15 to 45 percent slopes
CgB	Cecil gravelly sandy loam, 2 to 6 percent slopes-
CgB2	Cecil gravelly sandy loam, 2 to 6 percent slopes, eroded
CgC	Cecil gravelly sandy loam, 6 to 10 percent slopes
CgC2	Cecil gravelly sandy loam, 6 to 10 percent slopes, eroded
ClB3	Cecil clay loam, 2 to 6 percent slopes, severely eroded
ClC3	Cecil clay loam, 6 to 10 percent slopes, severely eroded
ClE3	Cecil clay loam, 10 to 20 percent slopes, severely eroded
Cm	Chewacla soils
Cn	Colfax sandy loam
Co	Congaree fine sandy loam
Cp	Congaree silt loam
CrB	Creedmoor sandy loam, 2 to 6 percent slopes
CrB2	Creedmoor sandy loam, 2 to 6 percent slopes, eroded
CrC	Creedmoor sandy loam, 6 to 10 percent slopes
CrC2	Creedmoor sandy loam, 6 to 10 percent slopes, eroded
CrE	Creedmoor sandy loam, 10 to 20 percent slopes
CtB	Creedmoor silt loam, 2 to 6 percent slopes
CtC	Creedmoor silt loam, 6 to 10 percent slopes
DuB	Durham loamy sand, 2 to 6 percent slopes
DuB2	Durham loamy sand, 2 to 6 percent slopes, eroded
DuC	Durham loamy sand, 6 to 10 percent slopes
DuC2	Durham loamy sand, 6 to 10 percent slopes, eroded
EnB	Enon fine sandy loam, 2 to 6 percent slopes
EnB2	Enon fine sandy loam, 2 to 6 percent slopes, eroded
EnC	Enon fine sandy loam, 6 to 10 percent slopes
EnC2	Enon fine sandy loam, 6 to 10 percent slopes, eroded
EnD2	Enon fine sandy loam, 10 to 15 percent slopes, eroded
FaB	Faceville sandy loam, 2 to 6 percent slopes
FaB2	Faceville sandy loam, 2 to 6 percent slopes, eroded
FaC2	Faceville sandy loam, 6 to 10 percent slopes, eroded
GeB	Georgeville silt loam, 2 to 6 percent slopes
GeB2	Georgeville silt loam, 2 to 6 percent slopes, eroded
GeC	Georgeville silt loam, 6 to 10 percent slopes
GeC2	Georgeville silt loam, 6 to 10 percent slopes, eroded
GeD2	Georgeville silt loam, 10 to 15 percent slopes, eroded
Go	Goldsboro sandy loam
GrB	Granville sandy loam, 2 to 6 percent slopes
GrB2	Granville sandy loam, 2 to 6 percent slopes, eroded
GrC	Granville sandy loam, 6 to 10 percent slopes
GrC2	Granville sandy loam, 6 to 10 percent slopes, eroded
GrD	Granville sandy loam, 10 to 15 percent slopes
Gu	Gullied land
HeB	Helena sandy loam, 2 to 6 percent slopes
HeB2	Helena sandy loam, 2 to 6 percent slopes, eroded
HeC	Helena sandy loam, 6 to 10 percent slopes
HeC2	Helena sandy loam, 6 to 10 percent slopes, eroded
HeD	Helena sandy loam, 10 to 15 percent slopes
HrB	Herndon silt loam, 2 to 6 percent slopes
HrB2	Herndon silt loam, 2 to 6 percent slopes, eroded
HrC	Herndon silt loam, 6 to 10 percent slopes
HrC2	Herndon silt loam, 6 to 10 percent slopes, eroded
HrD2	Herndon silt loam, 10 to 15 percent slopes, eroded
HrE	Herndon silt loam, 15 to 25 percent slopes
LdB2	Lloyd loam, 2 to 6 percent slopes, eroded
LdC2	Lloyd loam, 6 to 10 percent slopes, eroded
LdD2	Lloyd loam, 10 to 15 percent slopes, eroded
LoB	Louisburg loamy sand, 2 to 6 percent slopes
LoC	Louisburg loamy sand, 6 to 10 percent slopes

KEY

Map symbol	Mapping unit
LoD	Louisburg loamy sand, 10 to 15 percent slopes
LwB	Louisburg-Wedowee complex, 2 to 6 percent slopes
LwB2	Louisburg-Wedowee complex, 2 to 6 percent slopes, eroded
LwC	Louisburg-Wedowee complex, 6 to 10 percent slopes
LwC2	Louisburg-Wedowee complex, 6 to 10 percent slopes, eroded
Ly	Lynchburg sandy loam
Ma	Made land
MdB2	Madison sandy loam, 2 to 6 percent slopes, eroded
MdC2	Madison sandy loam, 6 to 10 percent slopes, eroded
MdD2	Madison sandy loam, 10 to 15 percent slopes, eroded
MdE2	Madison sandy loam, 15 to 25 percent slopes, eroded
Me	Mantachie soils
MfB	Mayodan sandy loam, 2 to 6 percent slopes
MfB2	Mayodan sandy loam, 2 to 6 percent slopes, eroded
MfC	Mayodan sandy loam, 6 to 10 percent slopes
MfC2	Mayodan sandy loam, 6 to 10 percent slopes, eroded
MfD2	Mayodan sandy loam, 10 to 15 percent slopes, eroded
MfE	Mayodan sandy loam, 15 to 25 percent slopes
MgB	Mayodan gravelly sandy loam, 2 to 6 percent slopes
MgB2	Mayodan gravelly sandy loam, 2 to 6 percent slopes, eroded
MgC	Mayodan gravelly sandy loam, 6 to 10 percent slopes
MgC2	Mayodan gravelly sandy loam, 6 to 10 percent slopes, eroded
MyB	Mayodan silt loam, thin, 2 to 6 percent slopes
MyB2	Mayodan silt loam, thin, 2 to 6 percent slopes, eroded
MyC	Mayodan silt loam, thin, 6 to 10 percent slopes
MyC2	Mayodan silt loam, thin, 6 to 10 percent slopes, eroded
MyD	Mayodan silt loam, thin, 10 to 15 percent slopes
NoA	Norfolk loamy sand, 0 to 2 percent slopes
NoB	Norfolk loamy sand, 2 to 6 percent slopes
NoB2	Norfolk loamy sand, 2 to 6 percent slopes, eroded
NoC	Norfolk loamy sand, 6 to 10 percent slopes
NoC2	Norfolk loamy sand, 6 to 10 percent slopes, eroded
OrB	Orangeburg loamy sand, 2 to 6 percent slopes
OrB2	Orangeburg loamy sand, 2 to 6 percent slopes, eroded
OrC2	Orangeburg loamy sand, 6 to 10 percent slopes, eroded
PkC	Pinkston sandy loam, 0 to 10 percent slopes

Map symbol	Mapping unit
PkF	Pinkston sandy loam, 10 to 45 percent slopes
Ps	Plummer sand
Ra	Rains fine sandy loam
Ro	Roanoke fine sandy loam
Sw	Swamp
VaB	Vance sandy loam, 2 to 6 percent slopes
VaB2	Vance sandy loam, 2 to 6 percent slopes, eroded
VaC2	Vance sandy loam, 6 to 10 percent slopes, eroded
WaA	Wagram loamy sand, 0 to 2 percent slopes
WaB	Wagram loamy sand, 2 to 6 percent slopes
WaC	Wagram loamy sand, 6 to 10 percent slopes
WgA	Wagram-Troup sands, 0 to 4 percent slopes
Wh	Wahee fine sandy loam
WkC	Wake soils, 2 to 10 percent slopes
WkE	Wake soils, 10 to 25 percent slopes
WmB	Wedowee sandy loam, 2 to 6 percent slopes
WmB2	Wedowee sandy loam, 2 to 6 percent slopes, eroded
WmC	Wedowee sandy loam, 6 to 10 percent slopes
WmC2	Wedowee sandy loam, 6 to 10 percent slopes, eroded
WmD2	Wedowee sandy loam, 10 to 15 percent slopes, eroded
WmE	Wedowee sandy loam, 15 to 25 percent slopes
Wn	Wehadkee silt loam
Wo	Wehadkee and Bibb soils
WsB	White Store sandy loam, 2 to 6 percent slopes
WsB2	White Store sandy loam, 2 to 6 percent slopes, eroded
WsC	White Store sandy loam, 6 to 10 percent slopes
WsC2	White Store sandy loam, 6 to 10 percent slopes, eroded
WsE	White Store sandy loam, 10 to 20 percent slopes
WtB	White Store silt loam, 2 to 6 percent slopes
WvD3	White Store clay loam, 2 to 15 percent slopes, severely eroded
WwC	Wilkes soils, 2 to 10 percent slopes
WwE	Wilkes soils, 10 to 20 percent slopes
WwF	Wilkes soils, 20 to 45 percent slopes
WxE	Wilkes stony soils, 15 to 25 percent slopes
Wy	Worsham sandy loam

Adapted from: U.S. Department of Agriculture, Soil Conservation Survey for Wake County, North Carolina, November 1970.

SOIL SURVEY - WAKE COUNTY, NORTH CAROLINA

Soil series and map symbols	Suitability as source of—		Degree of limitation for —				
					Recreation		
	Topsoil	Road fill	Homebuilding sites	Septic tank absorption fields	Campsites	Picnic areas	Intensive play areas
Altavista (AfA)	Fair	Fair	Severe: flooding	Severe: flooding	Moderate: flooding; fair trafficability.	Moderate: fair trafficability; flooding.	Moderate: fair trafficability; flooding.
Appling: (AgB, AgB2)	Fair	Fair	Moderate: coarse fragments.	Moderate: medium percolation rate.	Moderate: coarse fragments.	Moderate: coarse fragments.	Moderate: coarse fragments.
(AgC, AgC2)	Fair	Fair	Moderate: coarse fragments.	Moderate: medium percolation rate.	Moderate: coarse fragments; slopes of 6 to 10 percent.	Moderate: coarse fragments.	Moderate: coarse fragments; slopes of 6 to 10 percent.
(ApB, ApB2, AsB, AsB2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Slight	Slight	Slight
(ApC, ApC2, AsC, AsC2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.	Slight	Moderate: slopes of 6 to 10 percent.
(ApD)	Fair	Fair	Moderate: slopes greater than 10 percent.	Moderate: medium percolation rate; slopes greater than 10 percent.	Severe: slopes greater than 10 percent.	Moderate: slopes greater than 10 percent.	Severe: slopes greater than 10 percent.
Bibb (Mapped only in an undifferentiated unit with Wehadkee soils). (WO)	Poor	Fair	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table; poor trafficability.	Severe: flooding; high water table; poor trafficability.	Severe: flooding; high water table; poor trafficability.
Buncombe (Bu)	Poor	Good	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding	Severe: flooding; poor trafficability.
Cecil: (CeB, CeB2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Slight	Slight	Slight
(CeC, CeC2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.	Slight	Moderate: slopes of 6 to 10 percent.
(CeD)	Fair	Fair	Moderate: slopes of 10 to 15 percent.	Moderate: medium percolation rate; slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.	Moderate: slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.
(CeF)	Fair	Fair	Moderate to severe: slopes of 15 to 45 percent.	Severe: slopes greater than 15 percent.	Severe: slopes greater than 15 percent.	Moderate to severe: slopes of 15 to 45 percent.	Severe: slopes greater than 15 percent.
(CgB, CgB2, CgC, CgC2)	Fair	Fair	Moderate: coarse fragments.	Moderate: medium percolation rate.	Moderate: coarse fragments.	Moderate: coarse fragments.	Moderate: coarse fragments.
(ClB3, ClC3)	Poor	Fair	Moderate: clayey surface layer.	Moderate: medium percolation rate.	Moderate: clayey surface layer.	Moderate: clayey surface layer.	Severe: clayey surface layer.
(ClE3)	Poor	Fair	Moderate: clayey surface layer; slopes of 10 to 20 percent.	Moderate to severe: medium percolation rate; slopes of 10 to 20 percent	Severe: slopes greater than 10 percent.	Moderate: clayey surface layer.	Severe: clayey surface layer.

SOIL SURVEY - WAKE COUNTY, NORTH CAROLINA (continued)

Soil series and map symbols	Suitability as source of—		Degree of limitation for —				
					Recreation		
	Topsoil	Road fill	Homebuilding sites	Septic tank absorption fields	Campsites	Picnic areas	Intensive play areas
Chewacla (Cm)	Fair	Fair	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.
Congaree (Ce, Cp)	Good	Fair	Severe: flooding	Severe: flooding	Severe: flooding	Moderate: flooding.	Severe: flooding
Enon:							
(EnB, EnB2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate.	Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate: fair trafficability.
(EnC, EnC2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate.	Moderate: slopes of 6 to 10 percent; fair trafficability.	Moderate: fair trafficability.	Moderate: slopes of 6 to 10 percent; fair trafficability.
(EnD2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate.	Severe: slopes greater than 10 percent.	Moderate: slopes of 10 to 15 percent; fair trafficability.	Severe: slopes greater than 10 percent.
Helena:							
(HeB, HeB2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate.	Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate: fair trafficability.
(HeC, HeC2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate.	Moderate: slopes of 6 to 10 percent; fair trafficability.	Moderate: fair trafficability.	Moderate: slopes of 6 to 10 percent; fair trafficability.
(HeD)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate.	Severe: slopes greater than 10 percent.	Moderate: slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.
Lloyd:							
(LdB2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Slight	Slight	Slight
(LdC2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.	Slight	Moderate: slopes of 6 to 10 percent.
(LdD2)	Fair	Fair	Moderate: slopes greater than 10 percent.	Moderate: medium percolation rate; slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.	Moderate: slopes greater than 10 percent.	Severe: slopes greater than 10 percent.

SOIL SURVEY - WAKE COUNTY, NORTH CAROLINA (continued)

Soil series and map symbols	Suitability as source of—		Degree of limitation for —				
					Recreation		
	Topsoil	Road fill	Homebuilding sites	Septic tank absorption fields	Campsites	Picnic areas	Intensive play areas
Louisburg—Continued							
(LoC, LwC, LwC2) (For interpretations of the Wedowee soils in LwC and LwC2, refer to the Wedowee series.)	Fair	Fair	Moderate: depth to rock is 2 to 5 feet.	Moderate: depth to rock is 2 to 5 feet.	Moderate: slopes of 6 to 10 percent.	Slight	Severe: rock
(LoD)	Fair	Fair	Moderate: depth to rock is 2 to 5 feet; slopes greater than 10 percent.	Moderate: depth to rock is 2 to 5 feet.	Severe: slopes greater than 10 percent.	Moderate: slopes greater than 10 percent.	Severe: slopes greater than 10 percent.
Madison:							
(MdB2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Slight	Slight	Slight
(MdC2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.	Slight	Moderate: slopes of 6 to 10 percent.
(MdD2)	Fair	Fair	Moderate: slopes of 10 to 15 percent.	Moderate: medium percolation rate; slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.	Moderate: slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.
(MdE2)	Fair	Fair	Moderate: slopes of 15 to 25 percent.	Severe: slopes greater than 15 percent.	Severe: slopes greater than 15 percent.	Moderate: slopes of 15 to 25 percent.	Severe: slopes greater than 15 percent.
Mantachie (Me)	Fair to good.	Fair	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: high water table.	Severe: high water table.	Severe: high water table.
Vance:							
(VaB, VaB2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate; shrink-swell potential.	Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate: fair trafficability.
(VaC2)	Fair	Poor	Severe: shrink-swell potential.	Severe: slow percolation rate; shrink-swell potential.	Moderate: fair trafficability; slopes of 6 to 10 percent.	Moderate: fair trafficability.	Moderate: fair trafficability; slopes of 6 to 10 percent.
Wake:							
(WkC)	Poor	Poor	Severe: shallow to rock.	Severe: shallow to rock.	Slight to moderate: slopes of 2 to 10 percent.	Slight	Severe: rock
(WkE)	Poor	Poor	Severe: shallow to rock.	Severe: shallow to rock.	Severe: slopes greater than 10 percent.	Moderate: slopes of 10 to 25 percent.	Severe: slopes greater than 10 percent.

SOIL SURVEY - WAKE COUNTY, NORTH CAROLINA (continued)

Soil series and map symbols	Suitability as source of—		Degree of limitation for —				
	Topsoil	Road fill	Homebuilding sites	Septic tank absorption fields	Recreation		
					Campsites	Picnic areas	Intensive play areas
Wedowee:							
(WmB, WmB2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Slight	Slight	Slight
(WmC, WmC2)	Fair	Fair	Slight	Moderate: medium percolation rate.	Moderate: slopes of 6 to 10 percent.	Slight	Moderate: slopes of 6 to 10 percent.
(WmD2)	Fair	Fair	Moderate: slopes of 10 to 15 percent.	Moderate: slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.	Moderate: slopes of 10 to 15 percent.	Severe: slopes greater than 10 percent.
(WmE)	Fair	Fair	Moderate: slopes of 15 to 25 percent.	Severe: slopes greater than 15 percent.	Severe: slopes greater than 15 percent.	Moderate: slopes of 15 to 25 percent.	Severe: slopes greater than 15 percent.
Wehadkee (Wn, Wo) (For interpretations of the Bibb soil in Wo, refer to the Bibb series.)	Poor	Poor	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.	Severe: flooding; high water table.
Wilkes:							
(WwC)	Fair	Poor	Severe: depth to rock 1 to 10 feet; shrink-swell potential.	Severe: depth to rock 1 to 10 feet; shrink-swell potential.	Moderate: fair trafficability.	Moderate: fair trafficability.	Moderate: fair trafficability.
(WwE)	Fair	Poor	Severe: depth to rock 1 to 10 feet; shrink-swell potential.	Severe: depth to rock 1 to 10 feet; shrink-swell potential.	Severe: slopes greater than 10 percent.	Moderate: fair trafficability; slopes of 10 to 20 percent.	Severe: slopes greater than 10 percent.
Wilkes—Continued							
(WwF)	Fair	Poor	Severe: depth to rock 1 to 10 feet; shrink-swell potential.	Severe: depth to rock 1 to 10 feet; shrink-swell potential.	Severe: slopes greater than 20 percent.	Severe: slopes greater than 20 percent.	Severe: slopes greater than 20 percent.
(WxE)	Poor	Poor	Severe: stoniness; depth to rock 1 to 10 feet.	Severe: depth to rock 1 to 10 feet.	Severe: slopes greater than 15 percent.	Moderate: slopes of 15 to 25 percent.	Severe: slopes greater than 15 percent.

DAY TWO

8:30 a.m. FLOOD HAZARD MANAGEMENT: THREE STORIES

Purposes:

- To create a mood of excitement regarding the opportunities to develop flood hazard management strategies to meet a variety of goals.
- To introduce some of the ways in which the National Flood Insurance Program provides assistance to the community.

Activity:

- CF slide presentation.

NOTES:

8:45 a.m. **DESIGNING A FLOOD HAZARD MANAGEMENT PROGRAM IDENTIFYING GOALS, OPPORTUNITIES AND STRATEGIES**

Purpose:

- To reinforce the varying opportunities for flood hazard management presented by the slide show.
- To relate these opportunities to the pre- and post-flood stages of flood hazard management.
- To highlight the importance of local initiative in taking advantage of various state and federal assistance.
- To relate various opportunities and strategies described in slide show to goals described in preceding days session and still taped to wall of plenary session room.

Activity:

- Small group discussions within plenary session.
- Completion of Exercise B.

Review Questions

1. What are the variety of goals that the communities in the slide show tried to achieve?
2. What were the obstacles that those communities had to overcome? How did they overcome these obstacles?
3. What factors should be considered in developing a community flood hazard management program?
4. What approaches best address problems of existing development within the flood hazard area?
5. What approaches are best to control new development?

6. What kinds of federal/state/local assistance are available to assist communities?
7. What are the differing opportunities available to communities regarding their developed land versus their undeveloped land? What are the differing opportunities available before or between floods, or after a major flood?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapter III.

NOTES:

EXERCISE B

1. What were the goals of the flood hazard management adopted by the three communities in the slide sho

	Montgomery County	Baltimore County	Sanibel
Goals			

How do these goals relate to the general list of developed in the previous session?

2. What opportunities did each of the communities ex developing their flood hazard management programs what stage (pre-flood or post-flood) of flood haz Management?

Were the programs directed?

	Montgomery County	Baltimore County	Sanib
Opportunities			
Flood Hazard Management stage addressed			

EXERCISE B (continued)

3. What specific strategies did each community adopt to implement their flood hazard management plan?

   To what extent were federal and state agencies involved?

   What additional assistance might have been employed in each of the community situations?

	Montgomery County	Baltimore County	Sanibel Island
Strategies			
Federal and State Involvement			
Additional Assistance			

9:30 - 10:45 a.m. **THE FEDERAL AND STATE FRAMEWORK FOR COMMUNITY FLOOD HAZARD MANAGEMENT DECISION MAKING**

Purpose:

- To outline the structure and functions of various Federal and State programs that affect community flood hazard management:
  - -- The Floodplains and Wetlands Executive Order
  - -- NFIP
  - -- State Natural Resource Management
- To relate these various activities to the goals of community flood hazard management previously identified by participants.

Activities:

- Speech
- Roundtable
- Questions and Answers

Review Questions

1. What are the respective responsibilities of the Federal and State governments in flood hazard management.
2. How well are various programs coordinated at the Federal level? How might coordination be improved?
3. What new initiatives are being implemented to improve federal coordination?
4. What are some of the approaches that creative state governments have used to meet their challenge in mitigating flood hazards and protecting natural resources?

5. How do most state governments related their role in flood hazard management to that of the local community?

6. How is the role of the State likely to be affected as the result of new federal initiatives?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapters IV, V and VIII.

NOTES:

10:45 a.m. BREAK

11:00 a.m. THE NATIONAL FLOOD INSURANCE PROGRAM: WHAT IT DOES--WHAT IT DOESN'T DO

Purpose:

- To bring participants to a common level of understanding concerning the specific minimum requirements of the NFIP.
- To familiarize participants with the tools of the NFIP.
- To examine the extent to which the NFIP will help to meet the range of community flood hazard management goals.

Activities:

- Speech
- Reaction Panel
- Audience Questions and Answers

Review Questions

1. What are the two phases of the NFIP? How does a community enter the NFIP?
2. What are the basic regulatory concepts and tools of community participation in the NFIP?
3. What are the minimum requirements of participation in the Regular program of the NFIP? What function do they serve?
   - (a) What is meant by the Base Flood? 100-Year Flood?
   - (b) What is a Flood Hazard Boundary Map, Flood Insurance Study, FIRM Map, Floodway/Flood Boundary Map?
   - (c) How are Flood Profiles interpreted?

4. What new inititatives are being considered for the NFIP Program (1362, constructive total loss, Flood Plains Executive Order)? How will these initiatives likely affect development of community flood hazard management programs?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapter IV.

NOTES:

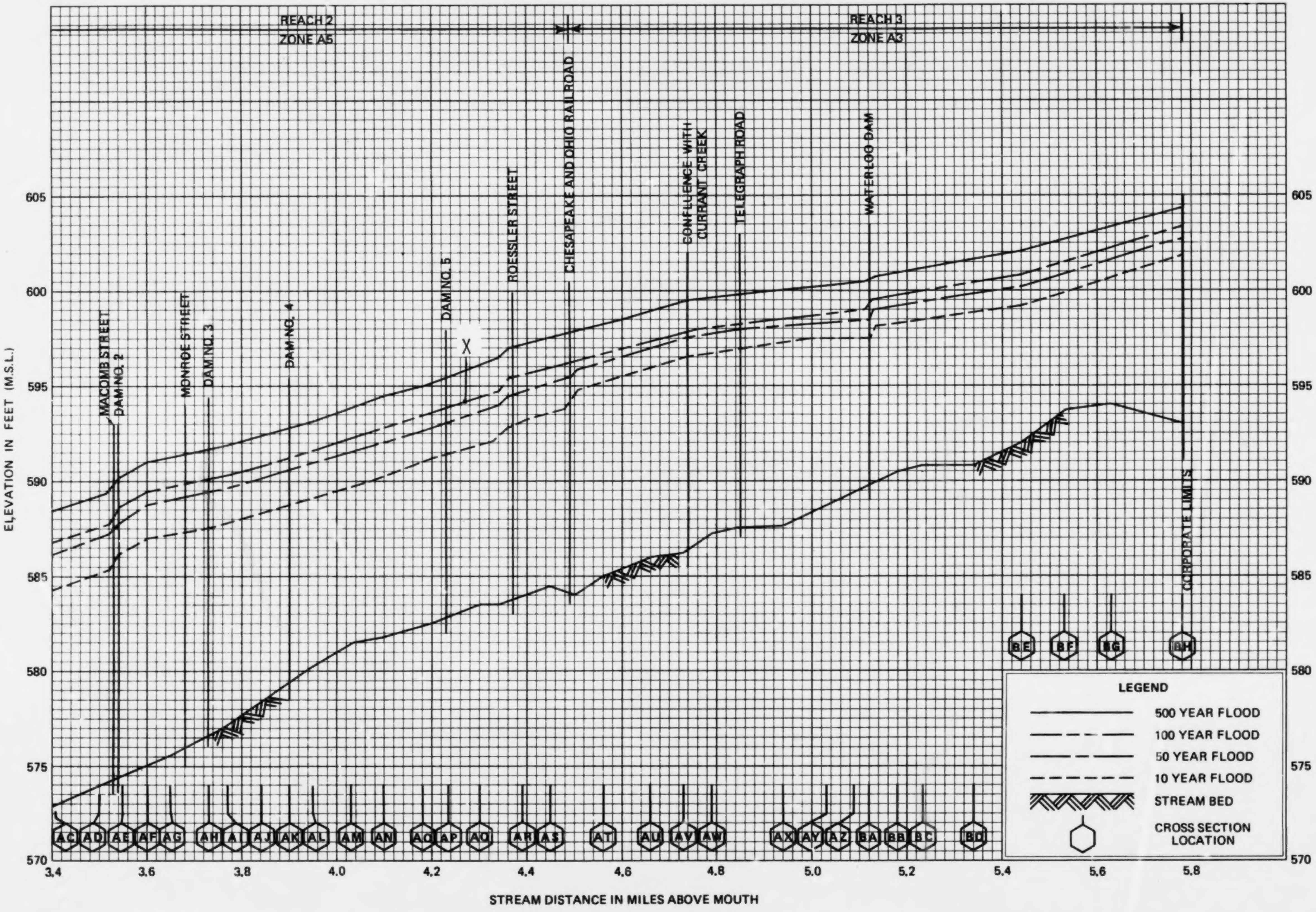
Reading a Profile

Flood profiles, contained in the Flood Insurance Study, typically show cross section elevation of the stream bed and the 10-year, 50-year, 100-year, and 500-year flood.

Scales: On the example opposite, each line on the vertical axis equals 1/2 foot elevation above sea level. On the horizontal axis each line equals .02 miles (approximately 106 feet) of distance above the mouth of the stream.

To locate a site on the horizontal axis: obtain the distance on the ground between the site and a cross section point (<$\underline{\overline{A}}$> -- <$\underline{\overline{A}}$>). For example, Point X is midway between cross sections AP and AQ.

To determine the flood water elevation at that point: locate the point on the flood line you're interested in. (Point X is plotted on the 100-year flood line.) Read the vertical axis to obtain the water elevation. The 100-year flood elevation at Point X is 594.1 feet (above mean sea level). To determine by how much a structure should be elevated to be above the base flood, subtract the ground elevation of the site from the flood elevation at the site.



FLOOD PROFILES

RIVER RAISIN

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

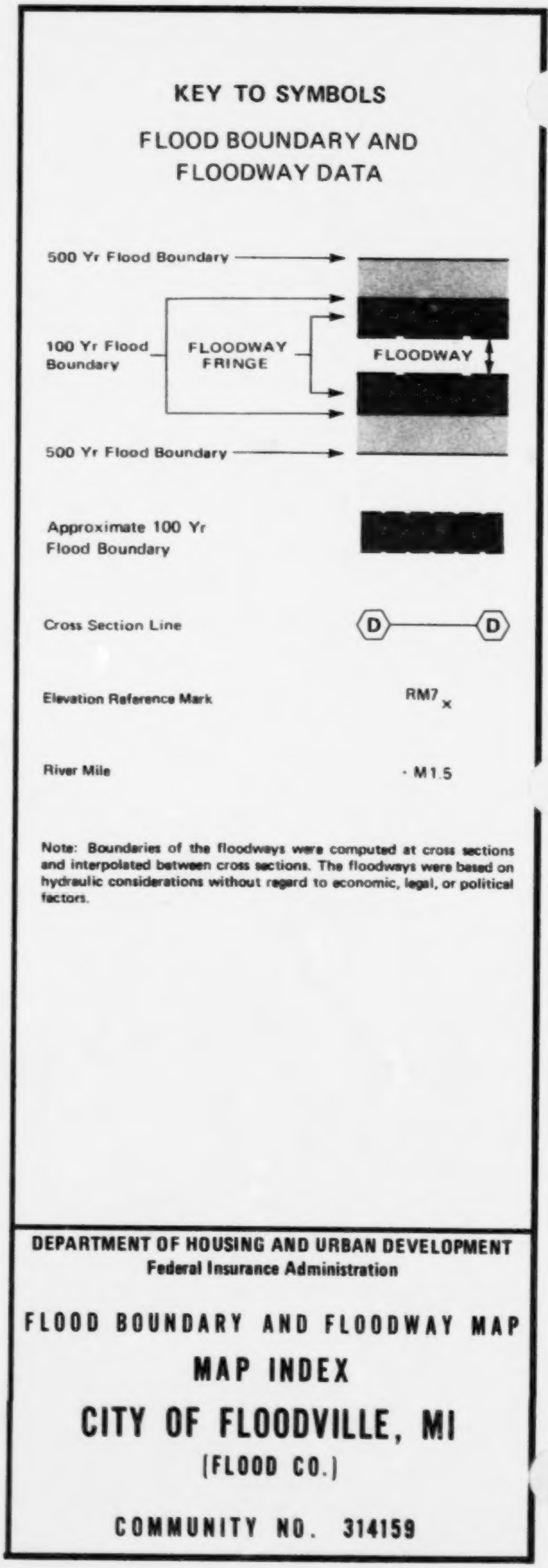
CITY OF FLOODVILLE, MI
(FLOOD CO.)

03P

Reading a Flood Boundary and Floodway Map

A Flood Boundary and Floodway Map identifies the boundaries of the floodway and the 100-year, and 500-year flood. The map also indicates the location of stream cross sections (<A> --- <A>). With references to the Flood Profile specific flood elevations may be determined at any site.

To locate a site on the map: Obtain the ground distance between the site and two or more points identified on the map (i.e., centerline of a street, bridge or reference mark). Convert the ground distances to map distances and plot the site on the map. Example: Point X is 200 feet west of the intersection of Lavender and Elm Streets and 200 feet southeast of the intersection of Rosessler and Elm Streets. Point X is not within the floodway.



KEY TO SYMBOLS

FLOOD BOUNDARY AND
FLOODWAY DATA

500 Yr Flood Boundary
100 Yr Flood Boundary
FLOODWAY FRINGE
FLOODWAY
500 Yr Flood Boundary
Approximate 100 Yr Flood Boundary
Cross Section Line
D
D
Elevation Reference Mark
RM7 x
River Mile
· M1.5

Note: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations without regard to economic, legal, or political factors.

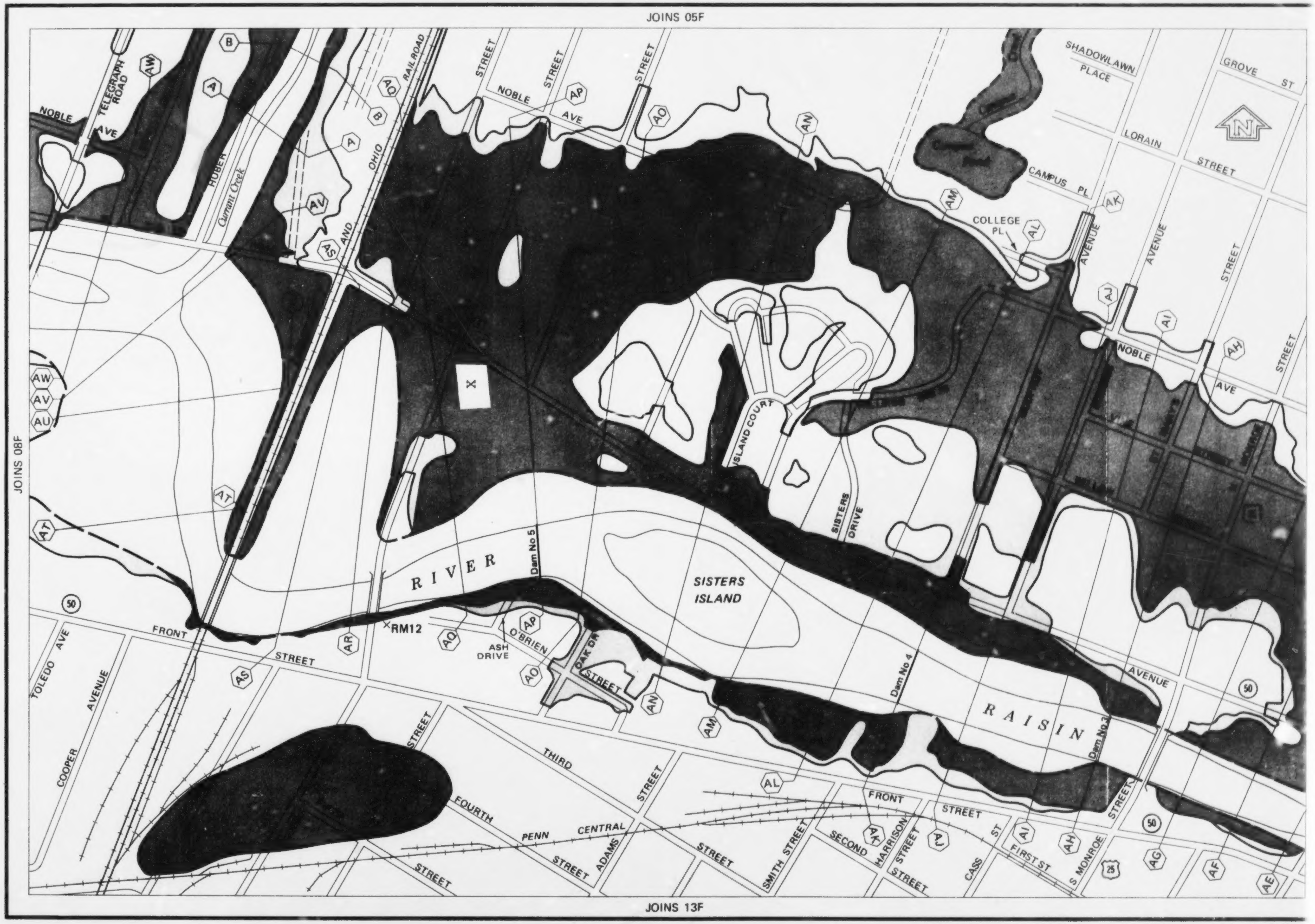
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

FLOOD BOUNDARY AND FLOODWAY MAP

MAP INDEX

CITY OF FLOODVILLE, MI
(FLOOD CO.)

COMMUNITY NO. 314159


JOINS 05F
JOINS 08F
JOINS 13F
NOBLE AVE
TELEGRAPH ROAD
HUBER
Currant Creek
OHIO AND RAILROAD
STREET
NOBLE AVE
SHADOWLAWN PLACE
GROVE ST
LORAIN STREET
CAMPUS PL
COLLEGE PL
AVENUE
STREET
NOBLE AVE
ISLAND COURT
SISTERS DRIVE
RIVER
RAISIN
SISTERS ISLAND
Dam No 5
Dam No 4
Dam No 3
RM12
FRONT STREET
O'BRIEN
ASH DRIVE
OAK DR
STREET
TOLEDO AVE
COOPER AVENUE
THIRD
FOURTH
PENN CENTRAL
STREET
ADAMS
SMITH STREET
SECOND STREET
HARRISON STREET
FRONT STREET
CASS ST
FIRST ST
S MONROE
AVENUE
50
25
X
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AE
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AG
AH
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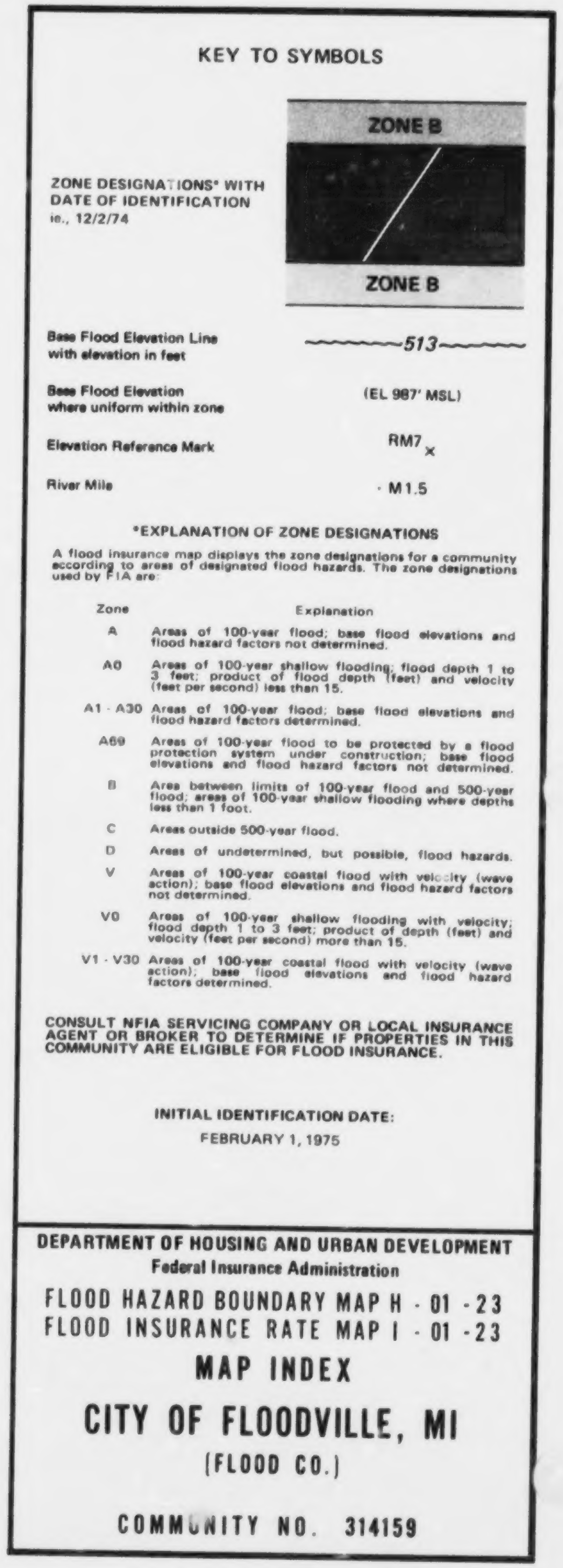
Reading a Flood Insurance Rate Map

The Flood Insurance Rate Map (FIRM) indicates the risk zones (for insurance purposes) within the flood hazard area, and map representations of 100-year flood elevation. Use the flood profile for specific site elevations.

Point X is within insurance rate zone A5.



KEY TO SYMBOLS

ZONE DESIGNATIONS* WITH DATE OF IDENTIFICATION
ie., 12/2/74

Base Flood Elevation Line with elevation in feet ~~~513~~~

Base Flood Elevation where uniform within zone (EL 987' MSL)

Elevation Reference Mark RM7 ×

River Mile · M1.5

*EXPLANATION OF ZONE DESIGNATIONS

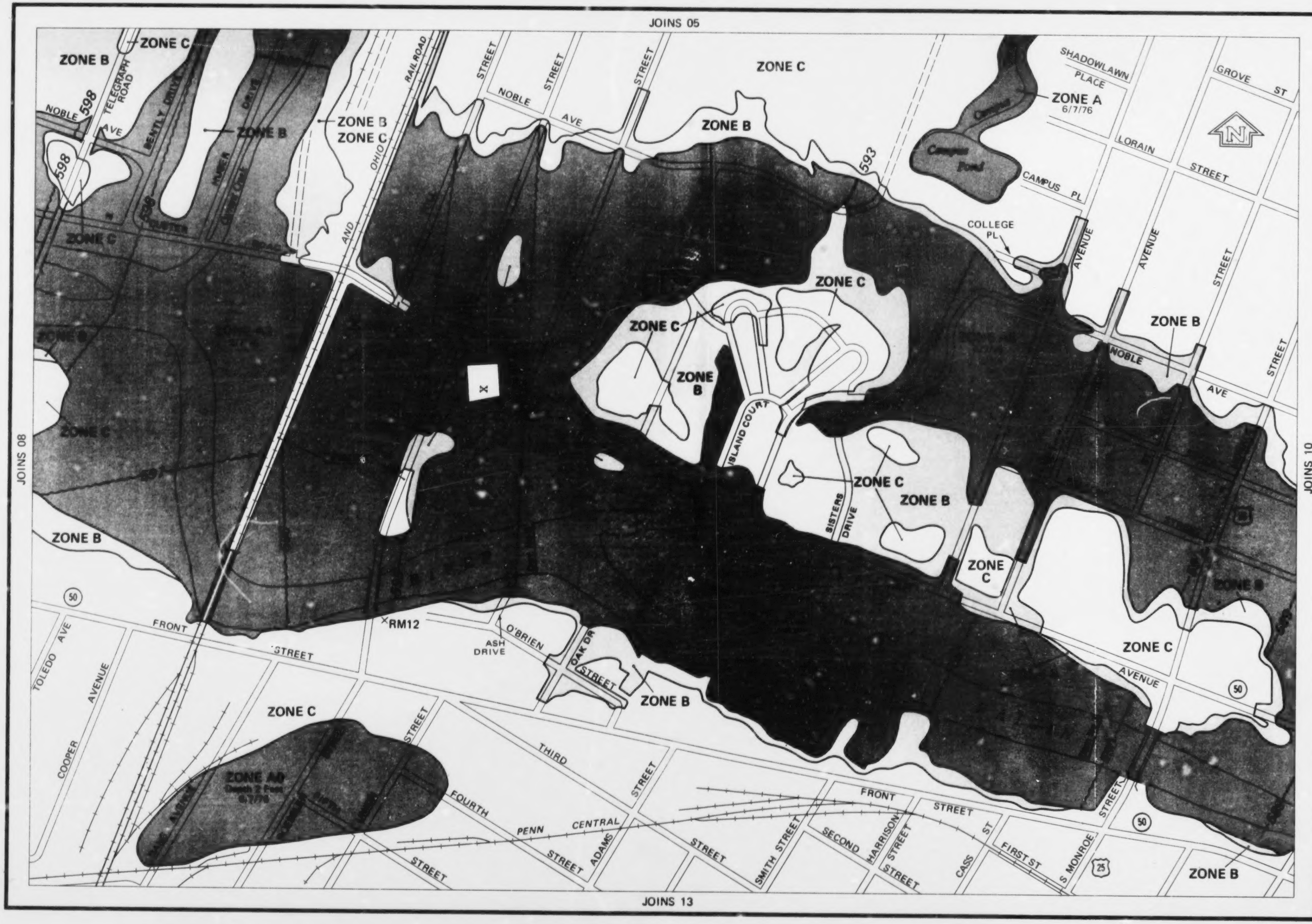
A flood insurance map displays the zone designations for a community according to areas of designated flood hazards. The zone designations used by FIA are:

Zone	Explanation
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding; flood depth 1 to 3 feet; product of flood depth (feet) and velocity (feet per second) less than 15.
A1 - A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A99	Areas of 100-year flood to be protected by a flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Area between limits of 100-year flood and 500-year flood; areas of 100-year shallow flooding where depths less than 1 foot.
C	Areas outside 500-year flood.
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V0	Areas of 100-year shallow flooding with velocity; flood depth 1 to 3 feet; product of depth (feet) and velocity (feet per second) more than 15.
V1 - V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

CONSULT NFIA SERVICING COMPANY OR LOCAL INSURANCE AGENT OR BROKER TO DETERMINE IF PROPERTIES IN THIS COMMUNITY ARE ELIGIBLE FOR FLOOD INSURANCE.

INITIAL IDENTIFICATION DATE:
FEBRUARY 1, 1975

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration
FLOOD HAZARD BOUNDARY MAP H - 01 - 23
FLOOD INSURANCE RATE MAP I - 01 - 23
MAP INDEX
CITY OF FLOODVILLE, MI
(FLOOD CO.)
COMMUNITY NO. 314159


JOINS 05
JOINS 08
JOINS 10
JOINS 13
ZONE B
ZONE C
TELEGRAPH ROAD
NOBLE
598
AVE
BENTLY DRIVE
ZONE B
ZONE C
ZONE B
ZONE C
RAILROAD
OHIO
AND
STREET
NOBLE
STREET
AVE
STREET
ZONE C
ZONE B
593
SHADOWLAWN
PLACE
ZONE A
6/7/76
Campus Pond
GROVE
ST
LORAIN
STREET
CAMPUS PL
COLLEGE PL
AVENUE
AVENUE
STREET
ZONE C
ZONE C
ZONE B
ZONE B
NOBLE
AVE
STREET
X
ZONE C
ISLAND COURT
ZONE C
ZONE B
SISTERS DRIVE
ZONE C
ZONE B
597
50
FRONT
STREET
RM12
ASH DRIVE
O'BRIEN
OAK DR
STREET
ZONE B
ZONE C
AVENUE
50
TOLEDO AVE
COOPER
AVENUE
ZONE C
ZONE AO
Depth 2 Feet
6/7/76
STREET
THIRD
FOURTH
PENN
CENTRAL
STREET
STREET
ADAMS
STREET
STREET
SMITH STREET
SECOND
HARRISON
STREET
STREET
FRONT
STREET
CASS
ST
FIRST ST
S MONROE
STREET
50
25
ZONE B

EFFECTIVE DATE

APPROXIMATE SCALE

400 0 400 800 1200 FEET

FLOOD HAZARD BOUNDARY MAP H - 09
FLOOD INSURANCE RATE MAP I - 09

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF FLOODVILLE, MI
(FLOOD CO.)

H&I-09

12:15 p.m. LUNCH

1:30 p.m. FLOOD HAZARD MANAGEMENT: ISSUES AND PROGRAMS

Purpose:

- To allow participants to explore in more detail the various issue and programs described in the morning sessions.

Activity:

- Concurrent small group sessions in the following areas:

  -- building standards;
  -- NFIP regulations;
  -- 1362;
  -- flood hazard mapping;

Review Questions

A. Building Standards

1. What specific provisions should be included in local building codes to insure that residents of new structures elevated above the 100-year flood do not inhabit basements which are below 100-year level?

2. What problems might building inspectors anticipate in enforcing standards?

3. How do building requirements of the NFIP relate to the acturially based insurance rates used by FEMA?

B. NFIP Regulations

1. What are the minimum requirements of the NFIP (Regular Phase) in terms of elevations, construction, and land use?

2. What programs, if any, exist for cooperation betwee upstream and downstream communities?

3. To what extent are fragile riverine ecosystems protected under the NFIP regulations?

C. Section 1362 (Post Disaster Acquisition/ Relocation under NFIP)

1. What is Section 1362? What are its major provisions?

2. How is Section 1362 being implemented currently? How much money has been appropriated?

3. How is eligibility for 1362 funds determined? What procedures must communities follow to acquire 1362 funds?

4. What restrictions are placed on the use of 1362 funds?

D. Flood Hazard Mapping

1. What role do maps play in the NFIP?

2. What is the status of FIA's community mapping process?

3. What is the data base of the community map? What are the sources of possible error in flood hazard boundary mapping? What kinds of changing conditions might affect the communities of flood hazard boundary?

4. What is the process of amending maps to reflect changing conditions?

5. What is the status of the new FIA map locator service?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapters IV, V and VII.

NOTES:

2:30 p.m. BREAK

2:45 - 3:45 p.m. LOCAL STRATEGIES FOR FLOOD HAZARD MITIGATION: CASE EXAMPLES

Purpose:

- To allow participants to examine in detail the way a particular community utilizes a strategy (or set of strategies) to accomplish flood hazard mitigation goals.
- To focus attention on the stages of flood hazard management (pre and post) to which the strategy was applied.
- To highlight the role of various federal, and state programs (NFIP, WQM) in accomplishing the strategy.
- To relate the strategies to the goals of flood hazard mitigation identified previously.

Activity:

- Concurrent small group sessions on community case examples which address a variety of flood hazard management strategies. For example:

  -- relocation;
  -- recreation/acquisition;
  -- storm water management;
  -- zoning;
  -- critical areas protection;
  -- development with sensitivity to ecosystems.

Review Questions

1. What are the major flooding problems in the community?

2. What are the estimated costs to the community of recurrent floods?

3. What opportunities did the community identify to begin to address their flooding problems? In the pre-flood situation? In the post-flood situation?

4. What specific flood hazard management strategies were proposed? Which ones were rejected and why? Which ones were adopted?

5. Who were the actors involved in the decision-making process? How were they involved?

6. What community, state and federal resources were required to implement the particular strategy? How were these resources obtained?

7. What lessons have been learned by community leaders in the process? What things might they approach differently if they were to start over again?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapters III and V

NOTES:

4:00 - 5:00 p.m. THE ROLE OF PUBLIC PARTICIPATIN IN COMMUNITY FLOOD HAZARD DECISION MAKING (PLENARY)

Purpose:

- To establish the importance of involving various publics in developing a community flood hazard management program.
  - -- Building a constituency for a comprehensive program.
  - -- Ensuring equity.
  - -- Building a constituency for implementation.
- To establish some performance standards for effective public participation.
- To expose participants to the range of techniques that are available for public involvement.

Activities:

- Speech
- Diverse Public Perspectives (see Exercise C attached)
- Roundtable Discussion
- Audience Questions and Answers

Review Questions

1. Who are the key actors both within and outside of the community who should be involved in the development of a community flood hazard management program? What range of perspectives are they likely to represent and why is it important to include them?

2. What are some of the key decision points in the development of a flood hazard management program where the public should be involved. What specific kinds of information/input can the various publics provide at each of these decision points?

3. What role can or should the public play during implementation of the flood hazard management program?
4. To what extent in the past has the public been involved in developing a community flood hazard management program? What methods were used? What has been the result of this level of involvement?
5. Does the NFIP have any specific requirements or guidance for public involvement?
6. What are some of the essential elements of an effective community public involvement effort? What are some of the techniques which may be most useful in achieving quality public participation?
7. What are some potential sources of assistance to communities in developing a meaningful public participation effort?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapter VI.

NOTES:

EXERCISE C

INTRODUCTION OF PARTICIPANTS

Participants for the Flood Hazard Institute were chosen to represent a diversity of opinions and backgrounds. The purpose of this segment of the program is to give everyone a better understanding of the attitudes and perspectives shared by fellow attendees, resource people, and Institute staff.

DIRECTIONS FOR EXERCISE: Indicate your opinion on each question by marking the horizontal line with an "x" above the appropriate number. Then indicate how strongly you care about this issue by circling a letter from A (very important issue) to E (unimportant issue) on the vertical line. You will have ten minutes to mark your responses, and then we will sample opinion in the group.

1) How much weight should be given to public opinion in the development of a community flood hazard management program?

------1---------2-----------3----------4---------5-----

The decisions involve complex technical issues and should be made by experts	Equal weight should be given to public opinion and expert conclusions.	The important decisions in developing a flood hazard management program are not that technical, and the public, who has to live with the results, should have the primary say.	A (very important issue) B C (moderately important) D (unimportant issue)

EXERCISE C (continued)

2) Granted that most people would like to see both environmental improvement and low taxes and economic development,how would you vote in a clear-cut choice between the economy and the environment in your town?

----------1------------2--------3-------4---------5-------

The economic stability of a community is the most important consideration. After all if people don't have jobs and money to spend they won't care about their environment.	Equal weight given to both	Maintaining the community's environmental quality is most important. Poor environmental quality produces all sorts of hidden community costs which too often aren't considered.

A (very important issue)

B

C (moderately important)

D

E (unimportant issue)

3) Should residents who knowingly choose to live in flood hazard areas be assessed some sort of tax to cover the community costs (emergency police, fire, rescue services, public utility repairs, warning and evacuation procedures) incurred as the result of a flood disaster?

------1---------2-------------3-------------4-------------5---------

No, these are costs rightly borne by the community as a whole. Besides, it would be impossible to establish an equitable tax.	Possibly in situations where the flood hazard is well defined and the resident who has a choice between a non-hazard location chooses the hazardous location because of the personal benefits (aesthetics, convenience) derived from the hazardous location.	Yes, these residents reap the benefits of such a location, so they should also bear the costs.

5:30 - 6:30 p.m. SOCIAL HOUR

6:30 - 7:30 p.m. DINNER

7:30 p.m. RECOMMENDATIONS FOR GROUP ACTION

Purpose:

- To continue the working group identified the first evening and give that group opportunities to develop ideas for follow-up activities after the conference.

Activity:

- Small group sessions

Review Questions

1. What are the major flooding problems in your community? What are the most important first steps to be taken to resolve these problems?
2. What role does your state play in encouraging community flood hazard management? How might the state role be enhanced?
3. Given the flood hazard management opportunities which exist in your community, what are likely to be the most effective strategies available to realize these opportunities?
4. Who are the key people in your community, region, state who should be involved in flood hazard management decision-making? Are they now involved?
5. What kinds of public involvement mechanisms may be utilized to involve members of the various publics in your community in the development of a flood hazard management program?

6. What are the first steps to be t
when you return home to ensure th
public involvement program to de
a flood hazard management progra
actually materializes?

References:

Flood Hazard Management and Natural
Protection: Community Action Guide
Chapters III and VI.

NOTES:

DAY THREE

8:30 - 9:30 a.m. ISSUES IN PUBLIC PARTICIPATION

Purpose:

- To allow participant to focus on the issues and tools that influence the development of a successful public involvement program.

Activities:

- Concurrent small group workshops on public participation issues and tools. These workshops might cover such topics as:

  -- Goal setting
  -- Coalition building
  -- Bargaining and negotiation
  -- Communication tools
  -- Motivating the public

Review Questions

A. Goal Setting

1. Who in the community should be involved in the setting of goals for a flood hazard management program? How can or should broader community goals be reflected?

2. How do you identify community goals? What techniques (questionnaires, local workshps, referendum) are most useful? How can you ensure that the goals you identify in fact reflect those of the entire community?

3. What do you do in situations when some goals seem to be in direct conflict? What are some effective methods for achieving compromise?

B. Coalition Building

1. How can building a coalition help the passage and implementation of a community flood hazard management program?

2. What interests should comprise your coalition. How may these interests be identified?

3. How does one identify the common interests which may bind a coalition?

4. What kinds of organizational decision-making will help keep a coalition together?

5. What resources, skills and outreach ability do the various interest groups which might comprise a coalition have which might be utilized in developing a comprehensive flood hazard management program?

C. Bargaining and Negotiation

1. When is formal bargaining or negotiation useful?

2. How do you establish those points which are not negotiable? Those that are?

3. How do you identify tradeoffs that various groups may be willing to make to come to agreement?

4. How do you approach an opposing group on the subject of bargaining?

5. When is it useful to have a third party assist in the bargaining process?

6. What type of technical expertise might be required during a negotiation process?

7. If a third party negotiator is used, what skills should he/she have?

D. Communication Skills

1. What are some of the most effective means to reach the general public? (news media, public television) What basic message should be relayed to different publics?

2. How should materials be presented to the general lay audience? How can you translate complicated technical analysis into simple English?

3. How can you be sure your message is being received and clearly understood? What kinds of feedback mechanisms are appropriate?

E. Motivating the Public

1. How do you overcome initial public apathy or unawareness? What techniques could you use to "sell" your program to the public?
2. What are some of the causes of public apathy? How do you overcome them?
3. What are some examples of techniques which have worked in other communities?
4. How do you keep the public involved and interested?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapter VI.

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Appendices.

NOTES:

9:30 - 10:00 a.m. BREAK AND SWITCH

10:00 - 12:00 noon DESIGNING A FLOOD HAZARD MANAGEMENT PROGRAM IN RIVERINE COMMUNITIES

Purpose:

- To examine in a realistic setting the factors tht affect the opportunities for flood hazard management in riverine communities.
- To examine the basic regulatory framework likely to result from community participation in the NFIP, and other Federal and State programs.
- To examine the range of strategies and tools that might be linked together to develop a comprehensive flood hazard management program according to the appropriate flood hazard management stage.
- To identify the economic and social interests that may be affected by alternative strategies.
- To explore the range of public participation techniques which would be useful when selecting and implementing a comprehensive community flood hazard management program.
- To establish the tradeoffs that must be made by a community in designing a flood hazard management program.

Activities:

- Participants will divide into six to eight groups, each of which will utilize a single hypothetical case example (included in the workbook) as a starting point for discussion.
- Each case study contains information on the following factors that affect and/or constrain opportunities for flood hazard management.

-- physical characteristics;
-- population;
-- flooding problems;
-- economic and social considerations;
-- political context;
-- additional institutional considerations;

Community maps on present land ues and flood hazard areas are included. Participants will draw on the case study material and their own experiences to address range of questions.

Review Questions:

1. Who are the interests with a stake in flood hazard management?

2. What is the nature of their stake?

3. What needs of various interests will have to be met in order to obtain their support in meeting flood hazard management goals?

   Local government
   Low income
   Business
     Banker
     Real estate developer
     Salesman
     Industry/Land
     Water dependent/Water based industry
   Civic Leader
   Environmentalist

4. What kinds of tradeoffs (economic/social/environmental/political) might various interests be willing to make?

5. What kinds of strategies can be adopted to reflect these tradeoffs and to respond to the flooding problems of this community? In the pre-flood period? In the post-flood period?

6. What are the likely impacts of various strategies on various interest groups? On community as a whole?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapters III, VII, and VIII.

NOTES:

OVERVIEW OF FLOOD HAZARD MANAGEMENT TOOLS

TOOLS	DESCRIPTION/PURPOSE [1]	REGULATORY STANDARDS	LIMITATIONS	COMMENTS
PLANNING/PLANS				
• Land use plans Comprehensive plans Master plans	• Guides to public and private development. • Medium for articulation of community goals • Useful in identifying: sources of data; potential development pressures; areas of critical ecological, cultural, or economic concern.	• A recommended planning consideration under NFIP.	• Generally have no legal force in themselves	• Hazard Mitigation goals need to be coordinated with a community's comprehensive plan. • Plans must be made a functional document in the decision-making process.
• Warning and evacuation (disaster preparedness)	• Outlines specific actions and responses to floods taken to reduce the risks to human life. • Elements include: flood forcasting; advanced warning systems; evacuation plans.	• Under NFIP. • Plans required for mobile home parks (with A Zone). • Recommended planning consideration under NFIP.	• Does not reduce the risks to property or structures. • Warning system must be maintained. • Public bears the cost.	• Plans must be made and support systems in place and tested before the flood event. • Plans are a necessary aspect of any community flood hazard management scheme.
• Predisaster contingency planning	• Guides use of disaster recovery monies and postdisaster reconstruction.	• Meet 406 requirements of Disaster Relief Act of 1974. See chapter V.	• Possible legal implications of designating areas in advance for acquisition.	• Broad policies to guide redevelopment in the post-disaster context need to be considered in a pre-disaster context. • Plans and policies need to be flexible and integrated into overall community objectives.

OVERVIEW OF FLOOD HAZARD MANAGEMENT TOOLS

TOOLS	DESCRIPTION/PURPOSE 1/	REGULATORY STANDARDS	LIMITATIONS	COMMENTS
REGULATION 2/				
	• Impose conditions on the use made of land controls: - the location - type of use - construction and design • Two approaches - prohibitory - performance standards	(See below)	• Limited application to existing uses. • Constitutional issues.	• Common regulatory approaches including zoning, subdivision, and building codes are supportive of one another.
• Zoning	• Specific use locations (zones) on map • Specifies use requirements	• Delineate floodway areas and prohibit new structural uses and land alterations which will individually or cumulatively increase flood heights or velocities beyond defined levels. • Establish flood protection elevations and protection standards for floodway and flood fringe areas and uses.	• Above and: • May be weakened by variances or exceptions. • Does not incorporate building design standards.	• Zoning traditionally used prohibitory approach, however: • Increased use of performance standard criteria or special premitting is an effective approach to management of sensitive resource areas such as floodplains and erosion prone areas.
• Subdivision	• Regulates the division of large parcels into smaller parcels for development. • Insures that land is for proposed (new) use and that improvements are provided.	• Prevent subdivision of land unsuitable for intended purposes. • Require that each building site have an area above flood elevation suitable for building purposes, onsite waste disposal (where applicable), and adequate access. • Require that flood hazard areas be noted on face of plat and, in some cases, the adoption of deed restrictions to control future uses in flood-prone areas. • Require flood protection for sewer, water, and roads installed by subdivider. • Require installation of drainage facilities or payment of fees in lieu of installation by subdivider. • In some instances, require dedication of flood areas as parks or for other open space purposes by the subdivider.	• Above and: • Only indirectly controls use of land; must be in combination with zoning. • Loopholes common.	

OVERVIEW OF FLOOD HAZARD MANAGEMENT TOOLS

TOOLS	DESCRIPTION/PURPOSE 1/	REGULATORY STANDARDS	LIMITATIONS	COMMENTS
• Transfer Development Rights (TDRs) • Purchase Development Rights (PDRs)	• Form of density transfer allows property owners to sell or transfer their rights to develop their property leaving the property in less intensive use.	N/A	• Requires specific enabling legislation. • New technique has limited application.	• Conservation easements are a similar technique. • Used mostly to protect farmland.
• Building codes	• Specify construction standards and practices including elevations, floodproofing, structural design and materials standards. • Protect health and safety by preventing or controlling surface and groundwater pollution.	• Require elevation of structure and utilities on fill, pilings, or by other means. • Alternatively, require structural floodproofing of buildings and utilities through special design and use of waterproof materials	• Applies to new uses. • Requires detailed flood data. • Must be used with other tools. • Requires careful enforcement.	• Sanitary codes indirectly can control development in flood hazard areas through soil suitability criteria.
• Drainage and erosion control 3/ (stormwater management) (land treatment)	• Control the amount of stormwater runoff and prevent soil erosion. • Prevent future increases in flood heights.	• Require onsite detention of storm waters.	• Effectiveness limited to small, frequent floods. • Applies to new construction only.	• Frequently, requirements are integrated into zoning, subdivision, and/or building codes.
• Dredge and fill	• Controls and removal (dredging), depositing of dredged material, and filling of wetland areas.	• See description of section 404, appendix A.	• Frequently applies to designated wetland areas only.	
• Critical areas 4/ protection	• Protect critical resource areas such as wetlands, floodplains, coastal zones, scenic river corridors.	• EO 11988, CZMA, Wild Scenic Rivers, etc.	• Requires natural areas inventory. • Requires use of tools (zoning, taxation, etc.) to implement.	• Frequently, performance standards for critical areas are incorporated within zoning and subdivision regulations.
• Facility siting review	• Requires impact review of proposals for large facilities or developments. • Promote avoidance of flood-prone sites.	• (Standards dependent on permit requirements).	• Generally applies only to large facilities of greater-than-local impact	

OVERVIEW OF FLOOD HAZARD MANAGEMENT TOOLS

TOOLS	DESCRIPTION/PURPOSE	REGULATORY STANDARDS	LIMITATIONS	COMMENTS
ACQUISITION/REDEVELOPMENT 5/				
	• Permanently removes structures from hazard area. • Achieves multiple goals (urban waterfront revitalization, hazard mitigation, provision of recreation and open space).	• See discussion: Section 1362, chapter V.	• Costly. • May result in loss of tax revenues.	• There are a variety of acquisition and tax relief strategies: - fee simple - easements - PDR - land banking - tax exemptions - deferred taxation - differential assessments - graduated property tax - taxation for best use - deductions Tax savings may result. See: Baltimore County Case Study, chapter III.
PUBLIC INFORMATION/ EDUCATION				
• Warning and evacuation plans (disaster preparedness)	• See description under Plans.			
• Educational	• Educate citizens to the nature of floods, flood hazards, and strategies to mitigate flood losses.	N/A	N/A	
• Disclosure requirements	• Provide advance notice (disclosure) of flood hazard to prospective land buyers.	• Interstate Land Sales Full Disclosure Act of 1968 (Federal)	• Generally applicable only to land transfers. • Often applies only to large acreage sales (50 acres and above).	• Increasingly states are adopting Disclosure Laws which apply to all land transfers.

OVERVIEW OF FLOOD HAZARD MANAGEMENT TOOLS

TOOLS	DESCRIPTION/PURPOSE	REGULATORY STANDARDS	LIMITATIONS	COMMENTS
ECONOMICS				
• NFIP	• Provides subsidized flood insurance. • Encourages adoption of floodplain management ordinances.	• (See detailed description in Chapter IV.)		
• Taxation	• Provides incentives and/or disincentives for certain land uses.	N/A	• Difficult to administer, may remove or reduce tax revenues.	• Three basic types: - preferential assessments - deferred tax laws - restrictive agreements • Special tax assessment to cover the costs of warning and evacuation have been suggested.
• Public finance policy	• (Capital budgeting process) effectively determines many land use decisions and development patterns • Can discourage development in high risk zones.	N/A	• Applies only to new, improved, or damaged services. • Local residents may not have control of federal allocations.	• Budgeting process must be linked to overall community development plans.

OVERVIEW OF FLOOD HAZARD MANAGEMENT TOOLS

1/ For description of the Administrative aspects of each tool see chapter VIII, appendix A.

2/ Portions adapted from J.A. Kusler, A Perspective on Floodplain Regulation for Floodplain Management, EP 1165-2-304, Washington, D.C., U.S. Army Corps of Engineers, June 1976.

3/ See Residential Stormwater Management, Urban Law Institute, American Society of Civil Engineers, National Association of Home Builders, 1975.

4/ See Guidebook for State and Local Governments: Critical Areas Program, July 1977 (The Institute of Rational Design, N.Y.)

5/ See Protecting Nature's Estate, Techniques for Saving Land, U.S. Department of Interior and The Nature Conservancy, December 1975.

Kusler, Jon, Floodplain Acquisition, Washington, D.C.: Water Resources Council, December 1979.

N/A - not applicable

Exercise D

Use this chart to record the flood hazard management op
identified in the workshop discussion of the case examp

Potential Opportunities for Flood Hazard Manageme

	Pre-Flood Situation	Post-Flood
Within 100-Year Floodplain Structures (Existing and Future) Undeveloped Land		
Outside Floodplain but within community		
Outside Community but within watershed		

Exercise E

Use this chart to record the results of the workshop discussion relating to possible strategies identified in the case example. Refer to chart in selecting the most appropriate strategies.

	Flood stage where most applicable			Affected Interests	Trade-offs
	Pre-Flood	During Flood	Post-Flood		
Strategy (tool)					

ROWLETT CREEK *

I. Regional Context/Physical Characteristics of Watershed

Rowlett Creek rises west of the city of McKinney and flows southeast to Lake Ray Hubbard on the East Fork Trinity River. The general land surface slope of the watershed is moderate or rolling. Stream slopes are steep in the upper portion of the basin and channels are deep cut into limestone with large channel capacities. Channel size and slope decrease on the main stem of Rowlett Creek in the lower half of the basin and the floodplains are relatively wide.

The drainage area of Rowlett Creek is approximately 136 square miles and includes all or portions of 10 municipalities and two counties. Approximately 8,100 acres of 9% of the total land area in the watershed lies within the 100-year floodplain.

The majority of the land area (70%) is presently used for crops and grazing. Although the area is still predominantly rural, it lies adjacent to one of the fastest growing metropolitan areas in the county. Urbanization in this watershed is proceeding rapidly and is expected to continue in the future. In particular, the cities of Richardson, Garland, and Plano have experienced phenomenal growth in residential, commercial and light industrial development in recent years.

II. Plano

Plano, with a 1977 population of 51,000 is one of the largest cities in the Rowlett Creek watershed. Its population has increased nearly 220% since 1970. This rapid population increase has resulted in a conversion of over 6,000 acres of prime agricultural land to residential, commerical and industrial purposes. Although a significant portion of the town is still devoted to agricultural purposes, increased urbanization is expected to significantly alter the community land-use patterns in the next 20 years (see attached land-use map for more details).

Because so much of the land area is devoted to grazing and crop production, forest land is extremely limited. The majority of trees are located in or directly adjacent to area creeks and drainage floodplains. These narrow strips of bottomland hardwoods constitute an area of great ecologic diversity providing an ideal habitat for a variety of plant and animal species. The majority of the community's limited wetlands are located within this bottomland hardwood forest area. The edge zones between the bottonland hardwoods and cropland or grazing land are well defined and represent another ecologically diverse area in the community.

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* The case study community resembles an actual community in some respects. Facts have been changed, however, to make the case study more useful in the Institutes. The study community should accordingly be considered fictitious.

As the result of intense development pressures, many of these bottomland hardwood forests are currently being altered through clearing/grading practices which seriously threaten the ecologic value of these areas.

III. Flooding Problems

The surface in Plano is gently rolling to almost level. The town is transected by a number of narrow, well incised streams the largest being Rowlett Creek, Cottonwood Creek and Spring Creek. Rowlett and Cottonwood Creeks with their headwaters located approximately 10 miles north of Plano can be classified as having U-shaped stream valleys with relatively broad floodplains. Spring Creek, which originates within the confines of Plano, however, has a narrow floodplain more typical of a V-shaped stream valley.

Plano has experienced few major flooding problems in the past due primarily to the fact that the older portion of the city is located on the high ground between Rowlett and Spring Creeks. However, in recent years, significant new development has occurred in the vicinity of Spring Creek and Rowlett Creek, often encroaching on the floodplain. If this pattern continues, Plano could experience serious flooding problems in the future. In addition, the recent rapid watershed development in communities upstream from Plano is expected to continue and could significantly increase the future flood hazard situation in Plano. To date, no major structural alterations have been made along any of the streams in the watershed, although several have been proposed.

IV. Economic/Social Considerations

Although Plano has experienced tremendous urbanization in recent years, a great deal of undeveloped land, primarily agriculture land, still remains. While some of this undeveloped land lies within the 100-year floodplain, the majority lies outside the designated flood hazard area.

The economic base in Plano, as in the rest of the watershed, is agricultural although the town is rapidly being transformed into a bedroom community serving a nearby expanding metropolitan area. Commercial development has increased tremendously in response to the growth of residential development. Industrial development is limited in Plano but is expected to increase significantly if rapid growth in the area continues.

Most of the recent development which has occurred within the flood hazard area consists of single-family residences, mobile homes, and commercial activities. It is estimated that under existing conditions, a 10-year flood event would produce nearly $400,000 in damages and a 100-year flood would produce over $1.5 million in damages. Continued rapid growth within the Rowlett Creek watershed and particularly within Plano is expected to increase these damage estimates significantly, unless strict development controls are implemented.

The existing sewage treatment facility located at the confluence of Rowlett and Cottonwood Creek, presently serves only the downtown area. However, city officials are considering extending sewer service to the area of Rowlett Creek due north of the treatment plant as this are contains a number of single-family residences with failing septic systems.

V. Political Context

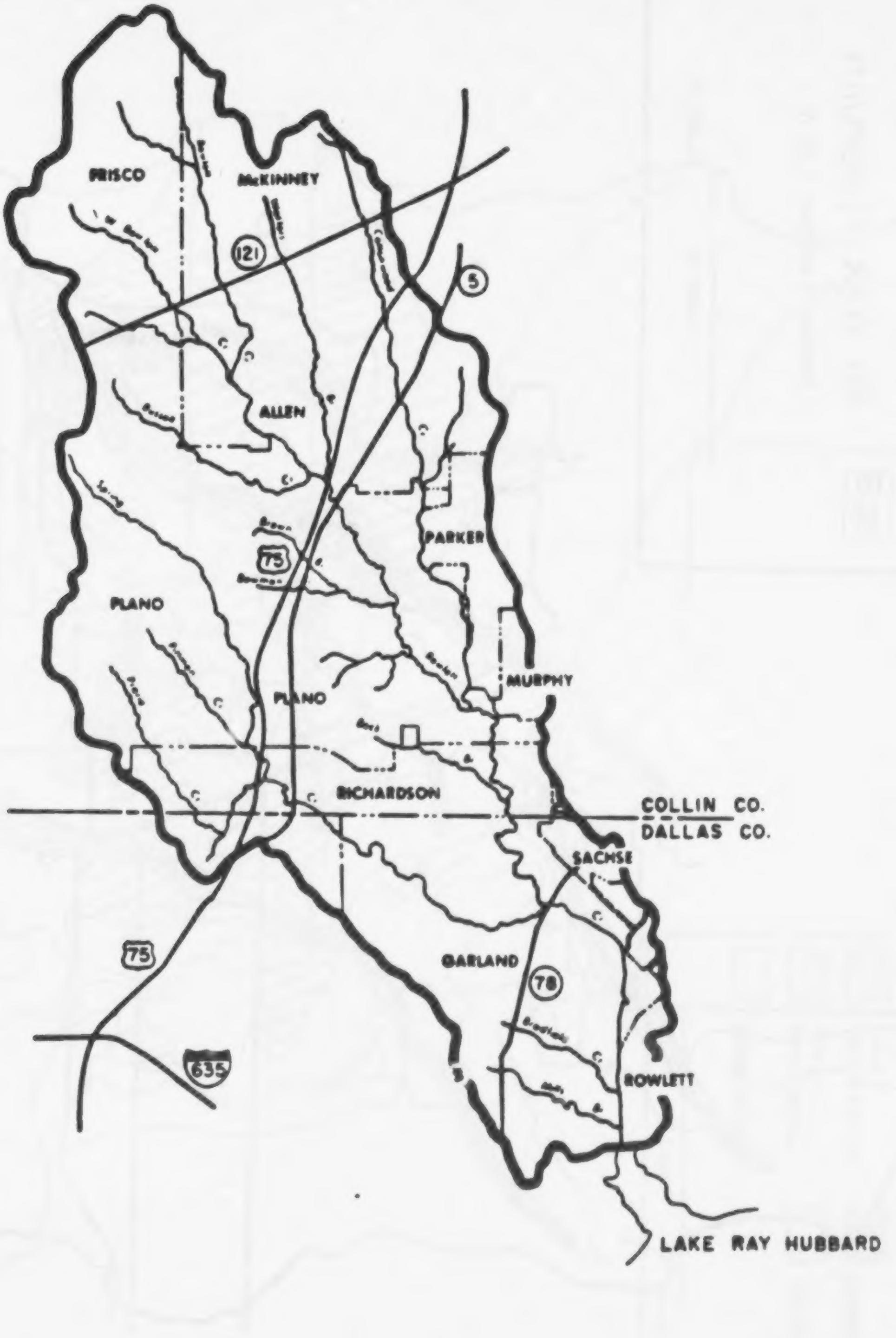
Plano is only one of ten communities sharing the Rowlett Creek watershed. Situated as it is in the center of the watershed, Plano's flooding situation is likely to be impacted by development in upstream communities. In addition, development activities within Plano may in fact contribute to flooding problems downstream. Although the merits of intergovernmental cooperation within the watershed are obvious, as yet there is no formal mechanism to achieve such cooperation.

The city of Plano is governed by a mayor who strongly favors continued growth. Development controls are not popular among many community residents, particularly the business interests who have realized a significant profit from the recent boom. The community has adopted standard zoning and subdivision ordinances. These have been amended to incorporate the minimum requirements of the NFIP including delineation of floodway district and a floodplain district, requirements for elevating new structures within the floodplain to the 100-year flood levels and limitations on new development within the defined floodway. However, the ordinances are not well enforced. Since the bottomland hardwood forests are the most attractive areas for residential development, city officials have been reluctant to impose serious constraints on building in these areas. The community has not yet experienced any significant flooding and, therefore, is unconvinced of the need for a comprehensive flood hazard mitigation program.

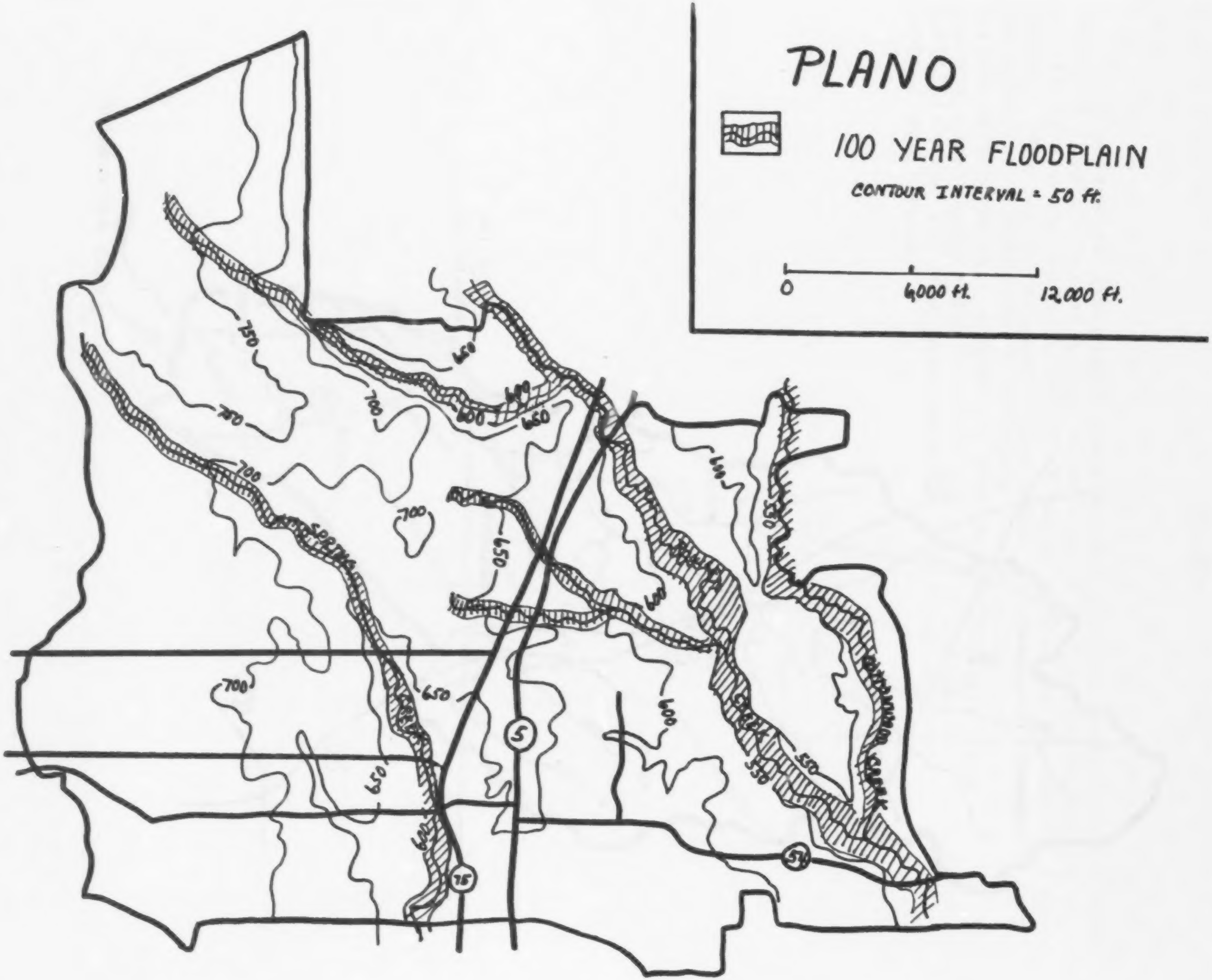
VI. Additional Institutional Considerations

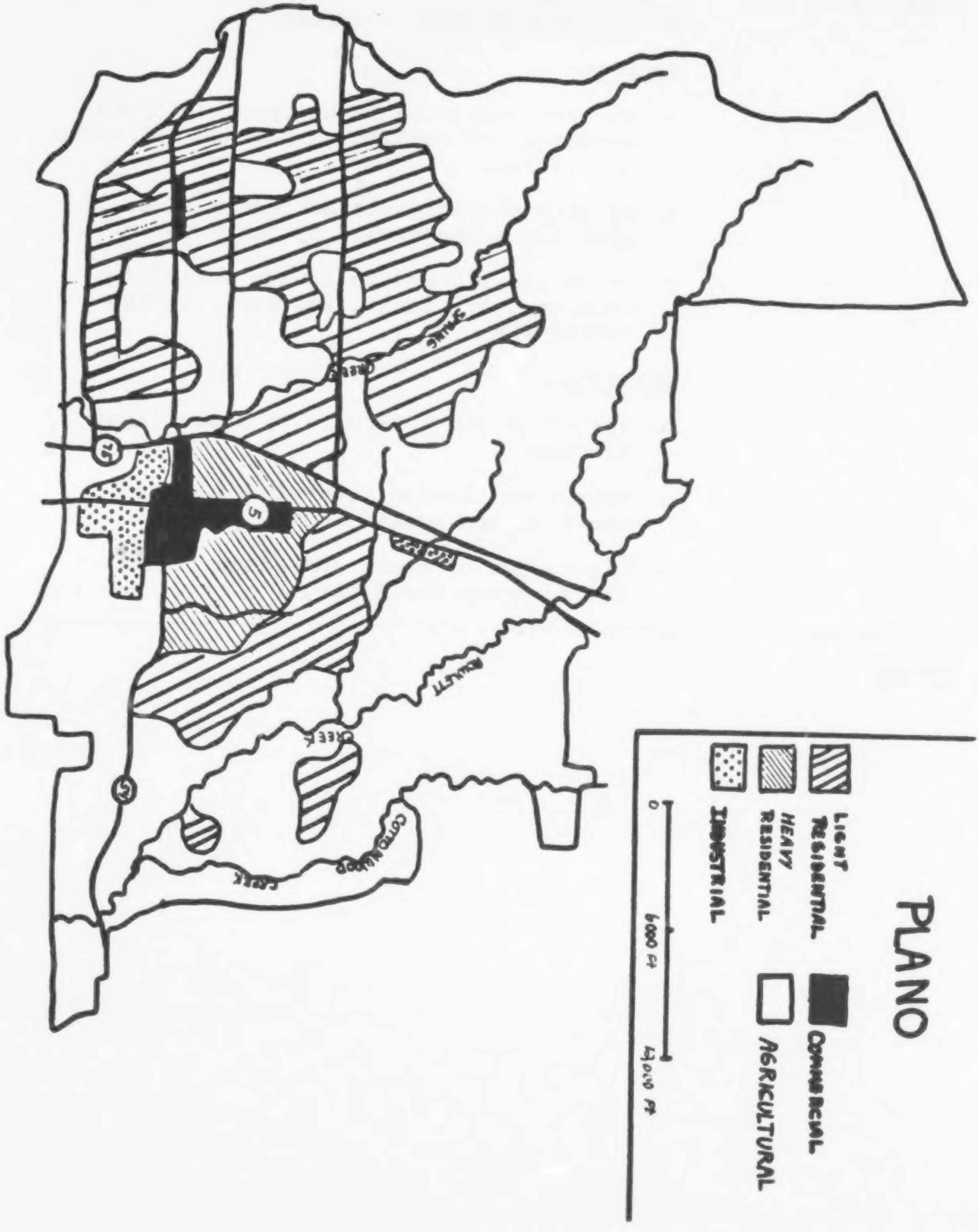
The state has recently adopted a floodplain law which establishes a 0.5 foot rise floodway and essentialy prohibits new development within the floodway. Local governments are required to review proposed new development projects within the 100-year floodplain to ensure that they will not produce an increase in flood heights that exceeds 0.5 feet.

The area-wide 208 plans prepared for the two counties involved identify urban storm water runoff and agricultural runoff as the two major sources of water pollution in the region. The plans recommend that local governments implement non-structural measures to mitigate the adverse impacts of future developments. Suggested implementation measures include requirements for on-site stormwater retention facilities for all new developments, and local sediment control ordinances.


FRISCO
McKINNEY
121
5
ALLEN
Spring
Brown
75
Bowman
PARKER
PLANO
PLANO
Rowlett
MURPHY
RICHARDSON
COLLIN CO.
DALLAS CO.
SACHSE
75
GARLAND
78
635
ROWLETT
LAKE RAY HUBBARD

ROWLETT CREEK BASIN
VICINITY MAP


PLANO
100 YEAR FLOODPLAIN
CONTOUR INTERVAL = 50 ft.
0
6,000 ft.
12,000 ft.
COTTONWOOD CREEK
CREEK
SPRING
CREEK
550
600
650
700
750
5
75
544


PLANO
LIGHT RESIDENTIAL
HEAVY RESIDENTIAL
INDUSTRIAL
COMMERCIAL
AGRICULTURAL
0
6000 ft
12,000 ft
SPRING CREEK
ROWLETT CREEK
COTTONWOOD CREEK
5
75

3:30 - 4:30 p.m. CONCLUSION--COMMUNITY FLOOD HAZARD MANAGEMENT: A CHALLENGE TO WORK TOGETHER

Purpose:

- To give participants an opportunity to exchange information on planned follow-up activities.
- To help participants achieve a sense of what was accomplished by the program.
- To relate planned follow-up activities back to goals identified early in the conference.

Activity:

- Series of short reports by small group leaders;
- Newsprint listing accomplishments of small groups posted around room;
- Discussion of goals and accomplishments led by group facilitator.

NOTES:

12:30 - 1:30 p.m. LUNCH

2:30 - 3:00 p.m. FINAL SMALL GROUP DISCUSSION

NOTES:

GLOSSARY

ACTUARIAL RATES[1] - Insurance rates determined on the basis of a statistical calculation of the probability that a certain event will occur. Actuarial rates are also called "risk premium rates." They are established by FIA pursuant to individual community flood insurance studies and investigations that are undertaken to provide flood insurance in accordance with the National Flood Insurance Act and with accepted actuarial principles, including provisions for operating costs and allowances.

AREA OF SPECIAL FLOOD HAZARD [1] - The land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year.

BARRIER ISLANDS [5] - Elongate seafront islands of sand formed by wave action.

BASE FLOOD (REGULATORY FLOOD) - The selected flood frequency for regulatory purposes. The NFIP has adopted the 100-year flood as the base flood to indicate the minimum level of flooding to be used by a community in its floodplain management regulations.

BERM - The horizontal portion of the backshore beach formed by sediments deposited by waves.

BOG [6] - A wetland usually developing in a depression or lake with poor drainage.

BOTTOMLAND HARDWOODS - Tree species that occur on water-saturated or regularly inundated soils. Classified as wetlands, these areas content both trees and woody shrubs.

BULKHEAD [5] - A vertical wall of wood, steel, or concrete, built parallel to the shoreline and designed to deflect waves and control erosion.

CHIEF EXECUTIVE OFFICER (CEO) [1] - The official of the community who is charged with the authority to implement and administer laws, ordinances, and regulations for that community.

COASTAL HIGH HAZARD AREA (CHHA) [1] - "Coastal high hazard area" means the area subject to high velocity waters, including, but not limited to, hurricane wave wash or tsunamis. The area is designated on a FIRM as Zone V1-30.

COMMUNITY [1] - Any State or area or political subdivision thereof, or any Indian tribe or authorized tribal organization, which has authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction.

EMERGENCY PROGRAM [1] - The program as implemented on an emergency basis in accordance with NFIP. It is an interim program to provide a first layer of subsidized insurance before the detailed risk studies from which actuarial rates are computed have been completed.

ENCROACHMENT [4] - Any fill, structure, building, use, accessory use, or development in the floodway.

ENCROACHMENT/FLOODWAY LINES [4] - The limits of obstruction to flood flows. These lines are on both sides of and generally parallel to the river or stream. The lines are established by assuming that the area landward (outside) of the lines will ultimately be developed in such a way that it will not be available to convey flood flows.

EROSION [1] - The process of the gradual wearing away of land masses.

ESTUARY [5] - A confined coastal water body with an open connection to the sea and a measurable quantity of salt in its waters.

FIRST LAYER COVERAGE [1] - The maximum amount of structural and contents insurance coverage available under the NFIP Emergency Program.

FLOOD [1]/FLOODING [1] - A general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland and/or tidal waters, and/or unusual and rapid accumulation of runoff of surface waters from any source.

FLOOD CONTROL WORKS - See FLOOD PROTECTION SYSTEMS.

FLOOD DISCHARGE [3] - The total quantity of water f
in a stream and adjoining overflow areas during t
flood. It is measured by the amount of water pas
point along a stream within a specified period of
and is usually measured in cubic feet of water pe
second (cfs).

FLOOD FREQUENCY [3] - The frequency with which a fl
a given discharge has the probability of recurrin
example, a 100-year frequency flood refers to a f
discharge of a magnitude likely to occur on the a
of once every 100 years or, more properly, has a
cent chance of being exceeded in any year. Altho
calculation of possible recurrence is often based
historical records, there is no guarantee that a
flood will occur at all within the 100-year perio
that it will not recur several times.

FLOOD HAZARD [2] - The potential for inundation and
the risk of life, health, property, and natural f
plain values.

FLOOD HAZARD BOUNDARY MAP (FHBM) [1] - An official
community, issued through the NFIP, where the bou
of the flood, mudslide (i.e., mudflow) and relate
areas having special hazards have been designated
Zone A, M, and/or E.

FLOOD HAZARD MANAGEMENT - Encompasses all local, St
Federal activities taken before, during, and afte
to reduce flood losses or in response to a flood

FLOOD INSURANCE [1] - The insurance coverage provid
the National Flood Insurance Program.

FLOOD INSURANCE STUDY (FIS) (FLOOD ELEVATION STUDY)
examination, evaluation, and determination of flo
and, if appropriate, corresponding water surface
or an examination, evaluation, and determination
(i.e., mudflow) and/or flood-related erosion haza

FLOOD INSURANCE RATE MAP (FIRM) [1] - An official map of a community on which the FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community.

FLOOD PROTECTION SYSTEMS (STRUCTURAL CONTROLS) [1] - Those physical structural works for which funds have been authorized, appropriated, and expended and which have been constructed specifically to modify flooding to reduce the extent of the area within a community subject to a "special flood hazard" and the extent of the depths of associated flooding. Such a system typically includes hurricane tidal barriers, dams, reservoirs, levees, or dikes. These specialized flood modifying works are those constructed in conformance with sound engineering standards.

FLOOD-RELATED EROSION [1] - The collapse or subsidence of land along the shore of a lake or other body of water as a result of undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as a flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding.

FLOODPLAIN/FLOOD-PRONE AREA - Any land area susceptible to being inundated by water from any source (see the definition of "flooding").

FLOODPLAIN MANAGEMENT [1] - The operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works, and floodplain management regulations.

FLOODPLAIN MANAGEMENT REGULATIONS [1] - Zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (covering, for example, floodplains, grading, and erosion control) and other applications of police power. The term describes such State or local regulations, in any combination thereof, which provide standards for the purpose of flood damage prevention and reduction.

FLOODPLAIN PRESERVATION [2] - The prevention of modification of the natural floodplain environment or maintenance of the floodplain environment in a condition as close as possible to its natural state using all practicable means.

FLOODPLAIN RESTORATION [2] - The re-establishment of a setting or environment in which the natural functions of the floodplain can again operate.

FLOODPLAIN VALUES [2] - Those natural and beneficial attributes associated with the relatively undisturbed state of the floodplain, including values primarily associated with water, living, and cultural resources.

FLOOD PROOFING [1] - Any combination of structural and nonstructural additions, changes, or adjustments to structures that reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

FLOODWAY - That portion of the floodplain consisting of the stream channel and overbank areas needed to carry and discharge flood flows. The floodway is intended to carry the deep and fast moving water.

FREEBOARD - A factor of safety usually expressed in feet above a flood level for purposes of floodplain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.

GROIN - A dam for sand. A groin is a structure built at right angles to a beach to interrupt longshore sand movement and trap sand in order to stabilize or widen the beach.

100-YEAR FLOODPLAIN - The land area adjoining a river, stream, lake, or ocean which is inundated by the 100-year flood. The 100-year flood is the regulatory (base) flood under the NFIP.

HYDRAULICS - The science dealing with the mechanical properties of liquids which describes the specific pattern and rate of water movement in the environment.

HYDROLOGY - The science of the earth's waters which describes the occurrence, circulation, distribution, chemical, and physical properties of water and its reaction with the environment.

LITTORAL [5] - Of or pertaining to the shore, especially of the sea; coastal.

LITTORAL DRIFT [5] - The movement of sand by littoral (longshore) currents in a direction parallel to the beach along the shore.

MARSH [6] - A wetland dominated by herbaceous or nonwoody plants, often developing in shallow ponds or depressions, river margins, tidal areas, and estuaries.

MANGROVE SWAMP (STAND) [5] - An assemblage of subtropical trees of the genus Rhezaphora forming dense thickets which extend into coastal waters.

NONSTRUCTURAL [2] - Any action taken to reduce or prevent flood losses in a floodplain other than the construction of storage dams, retention dams, diversions, channel improvements, and levees. All those adjustments in floodplain occupancy not specifically intended to modify flood behavior. Such adjustments include such devices as public acquisition of land, relocation of facilities, flood proofing, warning systems, and land use regulation.

PRACTICABLE [2] - Capable of being done within existing constraints. The test of what is pracicable depends upon the situation and includes consideration of the pertinent factors, such as environment, cost, or technology.

PRESERVE [2] - To prevent modification to the natural floodplain environment or to maintain it as closely as possible to its natural state.

REGULAR PROGRAM - The program authorized by the NFIP under which risk premium rates are required for the first part of available coverage (also known as "first layer" coverage) for all new construction and substantial improvements started on or after the effective date of the FIRM, or after December 31, 1974 for FIRM's effective on or before that data. All buildings, the construction of which started before the effective date of the FIRM, or before January 1, 1975 for FIRM's effective before that date, are eligible for first layer coverage at either subsidized rates or risk premium rates, whichever are lower. Regardless of date of construction, risk premium rates are always required for the second layer coverage and such coverage is offered only after FEMA has completed the Flood Insurance Study for the community.

REGULATORY FLOODPLAIN [3] - The area adjoining a river, stream, lake or ocean which is inundated by a regulatory flood. In riverine areas, the floodplain usually consists of a regulatory floodway and regulatory flood fringe (also referred to as a floodway fringe). In coastal areas, the floodplain may consist of a single regulatory floodplain area or a regulatory high-hazard area and a regulatory low-hazard area.

REGULATORY FLOODWAY [3] - A portion of the area a selected flood would occupy consisting of a stream channel and overbank areas calculated to be capable of conveying the selected flood discharge without flood heights or velocities increasing to exceed stated levels. The regulatory floodway is not an actual channel or cement conduit (as the term "floodway" is sometimes understood by engineers). Rather, it is an area (with or without alterations by man) calculated to be of sufficient width and having sufficient flood conveyance characteristics to pass the flood waters from upstream to downstream points without increasing flood heights more than a half foot, 1 foot, etc., or without substantially increasing velocities over what they would have been without assumed confinement. In this calculation, all areas outside of the floodway are assumed to play no role in passing flood flows, and the floodway itself is assumed to remain in an open condition. Floodway areas are subject to frequent high velocity flooding, often at considerable depths.

(REGULATORY) FLOOD FRINGE (also called the floodway fringe) - The portion of the regulatory floodplain beyond the limits of the regulatory floodway. It is subject to less frequent and lower velocity flooding and does not play a major role in passing flood flows.

RESTORE [2] - To re-establish a setting or environment in which the natural functions of the floodplain can again operate.

REVETMENT [5] - Armors the slope face of a dune or bluff with one or more layers of rock (riprap) or concrete.

RIFFLES - Stream channel bottoms are not uniform. They change in repeating patterns between shallow parts called riffles and deeper pools.

RIPRAP - Rock walls.

RISK PREMIUM RATES - See ACTUARIAL RATES.

SEAWALL [5] - A solid barricade built at the water's edge to protect the shore and to prevent inland flooding.

SECOND LAYER COVERAGE - An additional amount of insurance coverage made available when a community officially enters the Regular Program of the NFIP.

SEDIMENT LOAD - The amount of suspended sediment carried by the stream. The stream's sediment load varies with water velocity and sediment size.

SNAGGING - Removal of submerged or partially submerged tree stumps or branches.

STILL WATER STORM HEIGHT - The projected height or elevation of flood waters generated by coastal storms of various magnitudes calculated under ideal still water conditions where no wind generated waves or storm surges are present.

STATE COORDINATING AGENCY [1] - The agency of a State government or other office designated by a State governor or by State statute at the request of the NFIP Administrator to assist in the implementation of the National Flood Insurance Program in that State.

STRUCTURE [1] - For floodplain management purposes; a structure is a walled and roofed building, including mobile homes, and a gas or liquid storage tank that is principally above ground. "Structure" for insurance coverage purposes means a walled and roofed building, other than a gas or liquid storage tank, that is principally above ground and affixed to a permanent site, including mobile homes on foundations. For the latter purpose, the term includes buildings under construction, alteration, or repair, but does not include building materials or supplies intended for use in such construction, alteration, or repair, unless such materials or supplies are within an enclosed building on the premises.

STRUCTURAL - See FLOOD CONTROL WORKS

SUBSIDIZED RATES [1] - The rates established by the NFIP Administrator involving in the aggregate a subsidization by the Federal Government.

SUBSTANTIAL IMPROVEMENT [1] - Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either, (a) before the improvement or repair is started, or (b) if the structure has been damaged, and is being restored, before the damage occurred. For the purposes of this definition, "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. The term does not, however, include either (1) any project for improving a structure to comply with existing State or local health, sanitary, or safety code specifications that are solely necessary to assure safe living conditions or (2) any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.

SWALE [5] - A low-lying area frequently moist or marshy; an intermittent drainageway; a slough.

SWAMPS [6] - A wetland dominated by woody plants, shrubs, and trees such as maples, gums, and cyprus.

TSUNAMI [5] - A great sea wave produced by submarine earth movement or volcanic eruption.

VARIANCE [1] - A grant of relief by a community from the terms of a floodplain management regulation.

WATER SURFACE ELEVATION [1] - The projected heights in relation to Mean Sea Level reached by floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

WATERSHED [4] - A region or area contributing untimately to the water supply of a particular watercourse or water body.

WETLANDS [2] - Those areas that an inundated by surface or ground water with a frequency sufficient to support and, under normal circumstances, does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include bottomland hardwoods, swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

COMMON ABBREVIATIONS

DR&R - Office of Disaster Response and Recovery of FEMA

FEMA - Federal Emergency Management Agency

FHBM - Flood Hazard Boundary Map

FIA - Federal Insurance Administration of FEMA

FIS - Flood Insurance Study

FIRM - Flood Insurance Rate Map

NFIP - National Flood Insurance Program

REFERENCES

1. As defined in the regulations for the National Flood Insurance Program, 41 FR 46962, 1976.
2. A defined in the U.S. Water Resources Council guidelines for implementing Executive Order No. 11988, 43 FR 6030 (1978).
3. From J. Kusler and T. Lee, "Regulations for Flood Plains," American Society of Planning Officials, Planning Advisory Service Report No. 277 (1972).
4. From Wisconsin Administrative Code, Chapter NR 16 (July 1977).
5. From John Clark, Coastal Ecosystems Management: A Technical Manual for the Conservation of Coastal Zone Resources (New York: John Wiley and Sons Interscience, 1977).
6. As defined in Elinor Lander Horwitz, Our Nation's Wetlands (Washington, D.C.: Government Printing Office, 1978).

APPENDIX H

MODEL STUDENT MANUAL: COASTAL

FLOOD HAZARD MANAGEMENT

AND

NATURAL RESOURCE PROTECTION

MODEL COASTAL STUDENT MANUAL*

Prepared by
The Conservation Foundation
Washington, D.C.

For

The Federal Emergency Management Agency

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* This manual is based on the model training program developed by The Conservation Foundation. It should not be reproduced as is--but should be revised for each Institute to reflect any changes made to CF's model program.

BACKGROUND

This training program on Flood Hazard Management and Natural Resource Protection was developed by The Conservation Foundation for The Federal Emergency Management Agency. The program has been designed for local officials and citizen leaders as a means to increase their knowledge of:

- the basic requirements of the National Flood Insurance Program;
- the ways in which ecological and hazard mitigation requirements come together in establishing principles for physical management of the flood-prone areas;
- economic and social coincidences of interest and conflicts with flood management goals; and
- the various other federal, state, and local programs that come together on the floodplain and that could potentially lead toward more effective implementation of a community flood management program and natural resource protection program.

In addition, the program is intended to focus the attention of community leaders on means to disseminate the information provided in the training program throughout their community.

Those of you who are participating in the training institute for which this workbook has been prepared come from communities who face flood problems. You have been invited to participate in this program because you hold a leadership position in your community and are in a position to influence community flood hazard mitigation decisions.

It is our hope that this institute will provide you with an increased awareness of flood hazards, alternative management approaches, and methods for increasing public involvement in these key community resource decisions.

INSTITUTE SPONSORS

FEDERAL EMERGENCY MANAGEMENT AGENCY

FEMA is a new federal agency (created in March 31, 1979) responsible for the coordination of federal hazard mitigation efforts. The agency's specific responsibilities include overseeing key emergency programs in dam safety, emergency warning systems and severe weather warnings, as well as disaster relief and community flood hazard mitigation through the National Flood Insurance Program. The central office, Training and Education Division of FEMA has provided the funding for this institute as part of a program of increased technical assistance to communities.

THE CONSERVATION FOUNDATION

Through research, citizen training and communication with opinion leaders in the United States and abroad, The Conservation Foundation encourages wise management of the earth's resources -- its land, water, energy, air. A nonprofit organization, The Conservation Foundation designed and directed the training program of which this Institute is a part.

REGIONAL COORDINATOR

HOW TO USE THE INSTITUTE WORKBOOK

This Workbook is designed to be the principal companion of each participant attending the Community Flood Hazard Mitigation Training Institute. It contains the detailed information needed to conduct each part of the Institute program. The Program in brief also acts as a table of contents for the remainder of the book. The remainder of the workbook is organized by program element, and each program element is followed by whatever discussion questions, exercises and case example material may be necessary to work through that part of the training program.

Other materials prepared for your use by The Conservation Foundation include: "Flood Hazard Management and Natural Resource Protection: Community Action Guide" and "Community Action Guide Summary." The Training Manual contains seven separate chapters that outline in some detail the essential components of a community flood hazard mitigation and resource protection program highlighting the legal, environmental, social, and political factors that affect these decisions. The manual discusses further federal flood hazard mitigation initiatives. Particular attention is given to the NFIP and community responsibilities under that program.

The chapters in the Training Manual are organized to both be read as a book and to address single essential questions that could arise during a community's flood hazard mitigation planning process. If you examine the table of contents for each chapter, you may find areas you would like to read while at the training institute. The manual is designed for yor use when you return home, however. We hope that it will assist you in understanding the nature of the complex decisions that must be made to achieve flood hazard mitigation and allow you to raise the questions necessary to affect your community's choice of mitigation approaches.

The Community Action Guide Summary was mailed to you before the insititute and is designed for your use before and during the Institute and in conducting public involvement activities when you return home. It summarizes the larger guidebook, outlines the goals of effective public participation, and appropriate public participation mechanisms. We hope you will take the opportunity to read through this booklet while at the Institute, as it should be particularly helpful to you in outlining follow-up activities.

PROGRAM IN BRIEF

DAY ONE — Page

11:00 - 1:00 REGISTRATION

Briefing for Discussion Leaders

Location:

1:00 - 1:30 WELCOME AND INTRODUCTION

Speakers:

Location:

1:30 - 2:15 INTRODUCTION OF PARTICIPANTS

Discussion Leaders:

Location:

2:30 - 4:00 FLOODING AND FLOOD HAZARD MANAGEMENT ON COASTAL AREAS: AN OVERVIEW

Panel Members:

Location:

4:00 - 4:45 ESTABLISHING THE GOALS OF COMMUNITY FLOOD HAZARD MANAGEMENT

Discussion Leader:

Location:

5:00 - 6:00 SOCIAL HOUR

Location:

6:00 - 7:30 DINNER

Location:

DAY ONE (continued) Page

7:30 - 9:30 THE NATURE OF FLOODING IN COASTAL COMMUNITIES AND THE SPECIAL ROLE OF COASTAL ECOLOGICAL RESOURCES IN FLOOD HAZARD MITIGATION

Discussion Leaders:

Locations:

DAY TWO

8:30 - 8:45 FLOOD HAZARD MANAGEMENT: THREE STORIES

Location:

8:45 - 9:30 DESIGNING A FLOOD HAZARD MANAGEMENT PROGRAM: IDENTIFYING GOALS OPPORTUNITIES AND STRATEGIES

Location:

9:30 - 10:45 THE FEDERAL AND STATE FRAMEWORK FOR COMMUNITY FLOOD HAZARD DECISION-MAKING

Speaker:

Panel Members:

Location:

11:00 - 12:15 THE NATIONAL FLOOD INSURANCE PROGRAM: WHAT IT DOES AND DOESN'T DO

Speaker:

Panel Members

Location:

12:15 - 1:30 LUNCH

DAY TWO (continued) Page

1:30 - 2:30 FLOOD HAZARD MANAGEMENT ISSUES AND PROGRAMS

Discussion Leaders:

Location:

2:45 - 3:45 LOCAL STRATEGIES FOR FLOOD HAZARD MITIGATION: CASE EXAMPLES

Discussion Leaders:

Locations:

4:00 - 5:00 THE ROLE OF PUBLIC PARTICIPATION IN COMMNITY FLOOD HAZARD DECISION-MAKING

Speaker:

Location:

6:30 - 7:30 DINNER

Location:

7:30 - 9:00 RECOMMENDATIONS FOR GROUP ACTION

Discussion Leaders:

Locations:

DAY THREE

8:30 - 9:30 ISSUES IN PUBLIC PARTICIPATION

Discussion Leaders:

Location:

10:00 - 12:00 DESIGNING A FLOOD HAZARD MANAGEMENT PROGRAM IN COASTAL COMMUNITIES

Discussion Leaders:

Locations:

DAY THREE (continued)

		Page
12:00 - 1:30	LUNCH	
	Location:	
1:30 - 3:00	FINAL SMALL GROUP DISCUSSIONS	
	Discussion Leaders:	
	Location:	
3:30 - 4:30	CONCLUSION	
	Speaker:	
	Location:	

MODEL COASTAL STUDENT MANUAL

WORKSHOP ON FLOOD HAZARD MANAGEMENT AND NATURAL RESOURCE PROTECTION: THE COASTAL SETTING

DAY ONE

11:00 - 1:00 p.m. REGISTRATION

1:00 p.m. WELCOME

Purpose:

- To establish the major objectives of the Conference.
- To introduce key staff and resource people.
- To orient group to sequence of workshop session, time schedules, facilities, and administrative announcements.

Activity:

- Plenary session speaker.

NOTES:

1:30 - 2:15 INTRODUCTION OF PARTICIPANTS

Purpose:

- To introduce community participants and their communities to one another.
- To establish the function of the working group at the conference.

Activity:

- Small group discussion sessions within the plenary room.

NOTES:

2:30 - 4:00 p.m. FLOODING AND FLOOD HAZARD MANAGEMENT IN COASTAL AREAS: AN OVERVIEW

Purpose:

- Create participant understanding of inherent complexities of coastal flood hazard management.
- To give an historical perspective to coastal flood hazard management.
- To address changing directins in coastal flood hazard management in response to the perceived weaknesses of the traditional approach.

Activities:

- Film
- Reaction Panel Discussion
- Audience Questions and Answers

Review Questions

1. What are the special problems of protecting the coastal floodplain? (Dynamic nature of coastal floodplain, fragility of coastal ecosystem.)
2. What is the relationship of watershed and drainage management to coastal flooding problems?
3. What kinds of difficulties are incurred in predicting the landfall and wind force of hurricanes?
4. In what manner do the special attractions of the beach contribute to social and economic difficulties in the management of coastal flood hazards?

5. What are the weaknesses of traditional approaches to coastal flood hazard management?

6. What are the changing directions in our current approach to coastal flood hazard management?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapters I and II.

NOTES:

4:00 - 4:45 p.m.

ESTABLISHING THE GOALS OF COMMUNI HAZARD MANAGEMENT

Purpose:

- To assist participants in esta
  the target goals for which the
  develop strategies.
- To introduce participants to e
  by helping them appreciate the
  perspectives with which they a
  flood hazard management.

Activities:

- Exercise on Goals (Exercise A
- Group Discussion

Review Questions

1. What are the most important go
   consider in developing a commu
   flood hazard management progra
2. How do various interest groups
   in their assessment of goals?
3. How can or should other commun
   goals be integrated with flood
   management goals?

References:

Flood Hazard Management and Natur
Protection: Community Action Gui
Chapter III.

NOTES:

Exercise A

Goals for Community Flood Hazard Management

Of the goals listed below, which do you feel are the four most important to accomplish in developing a community flood hazard management program?

Rank/Goals

____ 1 Minimize fiscal impact of floods.

____ 2 Reduce erosion and sedimentations.

____ 3 Reduce property loss.

____ 4 Preserve natural areas.

____ 5 Protect safety of population.

____ 6 Reduce flood damage to public property.

____ 7 Distribute management costs fairly.

____ 8 Preserve open space and recreation.

____ 9 Maintain good water quality.

____ 10 Encourage economic development.

Which of the following categories of interest groups do you most closely identify with?

____ 1 Local officials.

____ 2 State officials.

____ 3 Floodplain resident.

____ 4 Local businessman (economic interests).

____ 5 Environmentalists.

____ 6 Civic group member (Red Cross, church group).

4:30 p.m. BREAK

5:00 p.m. SOCIAL HOUR

6:00 p.m. DINNER

7:30 - 9:00 p.m. THE NATURE OF FLOODING IN COASTAL COMMUNITIES AND THE SPECIAL ROLE OF COASTAL ECOLOGICAL RESOURCES IN FLOOD HAZARD MITIGATION

Purpose:

- To assist participants in identifying and understanding the causes of flooding and the nature of flood hazards in their community.
- To help participants understand the functioning of important coastal ecosystems for hazard mitigation purposes.
- To familiarize participants with various uses of natural resource data and maps as community planning and decision-making tools.

Activities:

- Six to eight concurrent small group sessions which discuss the special ecological characteristics of:

  a) Beaches and oceans
  b) Estuaries and bay areas
  c) Tidal rivers

- Land Use Suitability Analysis--Mapping Exercise

Review Questions

1. What are the key coastal ecological resource types?
2. Where do they commonly occur? (In what associations?)

3. How sensitive are these resources to the activities of man?

4. What role do each of these resources play in flood hazard mitigation?

5. How can these resources be protected? What management policies should be applied?

6. What is a suitable community base map? (scale and availability)

7. What environmental factors or values are of particular importance to the community? (i.e., septic tank siting, hazard mitigation, etc.) What is the purpose or goal for the mapping project?

8. What technique, medium or materials are most appropriate to use in representing this information? How much will it cost?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapter II.

NOTES:

IDENTIFYING NATURAL RESOURCE AND FLOOD HAZARD DATA SOURCES FOR DECISION-MAKING

WORKSHOP MATERIALS

BASE MAPS [1]

There are three categories of base maps: planimetric, topographic, and orthophoto.

A planimetric map shows roads, structures, political boundaries, and waterways, etc. in two dimensions. It illustrates horizontal positioning, not the height of hills or valleys.

A photogrammetric planimetric map is a planimetric map which has been prepared from aerial photographs and has been corrected so that horizontal measurements taken from the map accurately reflect the distance on the ground within a certain tolerance.

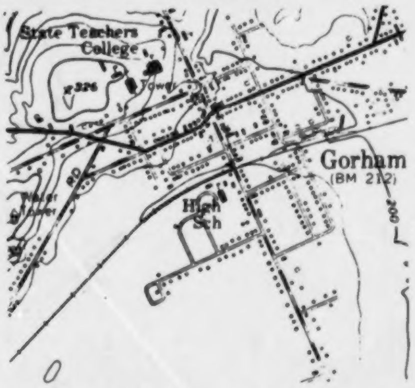
A topographic map shows the type of information illustrated on a planimetric map plus it has contour lines to show hills and valleys of the land, drainage patterns and the steepness of slopes.

A photogrammetric topographic map is a topographic map which has been prepared from aerial photographs and has been corrected so that both horizontal and vertical measurements taken from the map accurately reflect the distances and elevations on the ground within a certain tolerance.

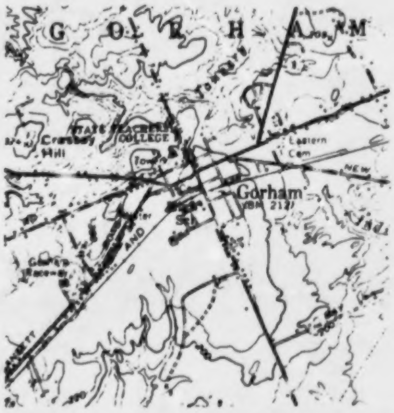
An orthophoto map is a map composed of a corrected aerial photograph on which features such as road names, place names, property boundaries, and political boundaries have been added. All the features which appear on an aerial photograph also appear on an orthophoto map.

MAP SCALE [2]

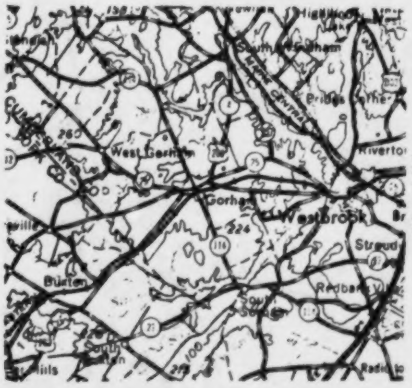
Map scale defines the relationship between the measurements of the features as shown on the map and as they exist on the Earth's surface. Scale is generally stated as a ratio or fraction —


State Teachers College
Tower
Gorham
(BM 212)
High Sch
Water Tower

1:24,000 scale,
1 inch = 2,000 feet.
Area shown,
1 square mile


G O R H A M
STATE TEACHERS COLLEGE
Crosby Hill
Tower
Eastern Cem
Gorham
(BM 212)

1:62,500 scale.
1 inch = about 1 mile.
Area shown,
6¾ square miles


South Gorham
West Gorham
Riverton
Gorham
Westbrook
Stroudwater
Buxton
South Gorham
Redbank Village

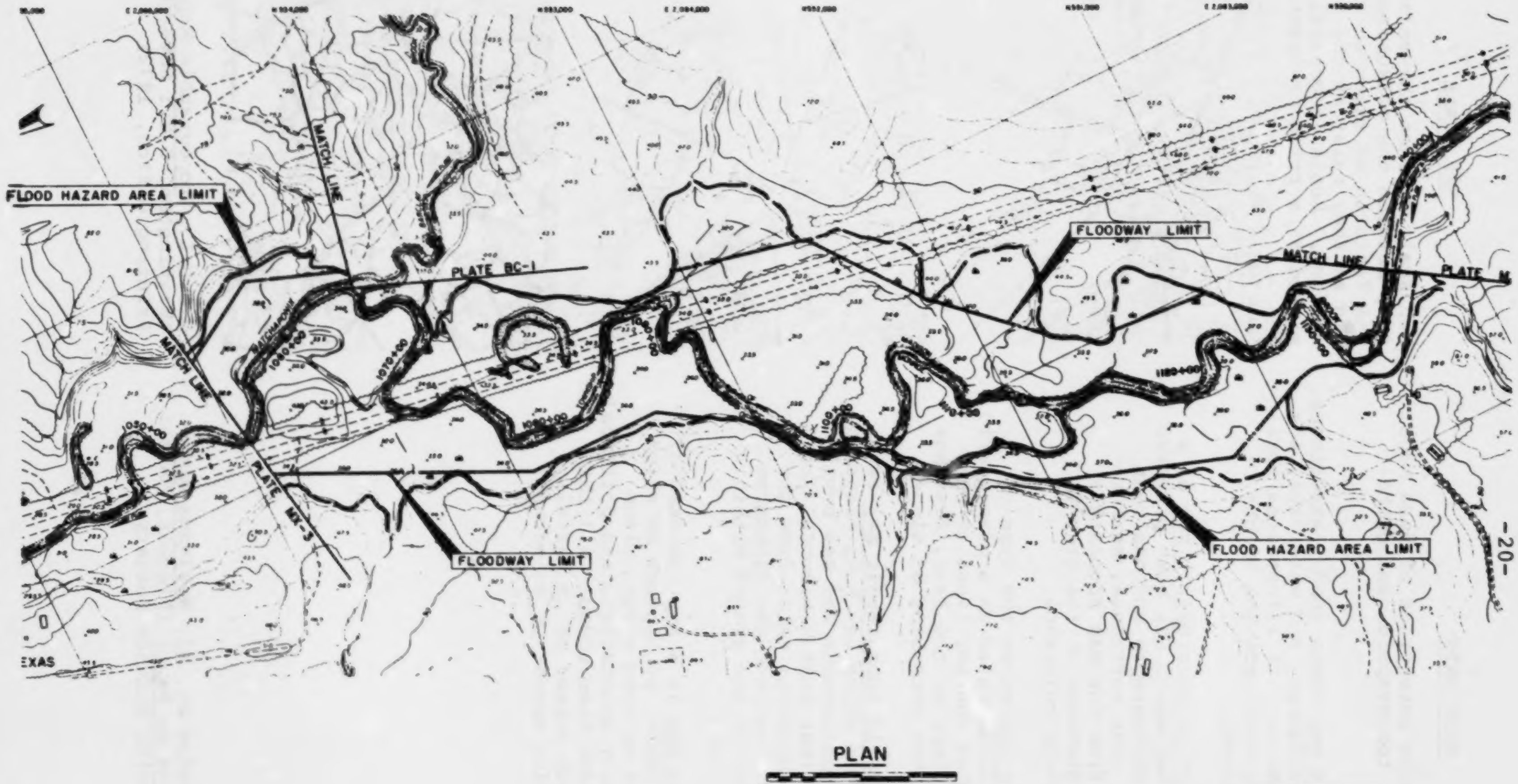
1:250,000 scale.
1 inch = about 4 miles.
Area shown,
107 square miles

---

1. Barbara Maire et. al, Wetlands and Floodplains on Paper (Lincoln, Mass.: Massachusetts Audubon Society, undated)

2. U.S.G.S., Topographic Maps (Washington, D.C.: Government Printing Office, 1972)

FLOODPLAIN DELINEATION ON A PHOTOGRAMMETRIC TOPOGRAPHIC MAP

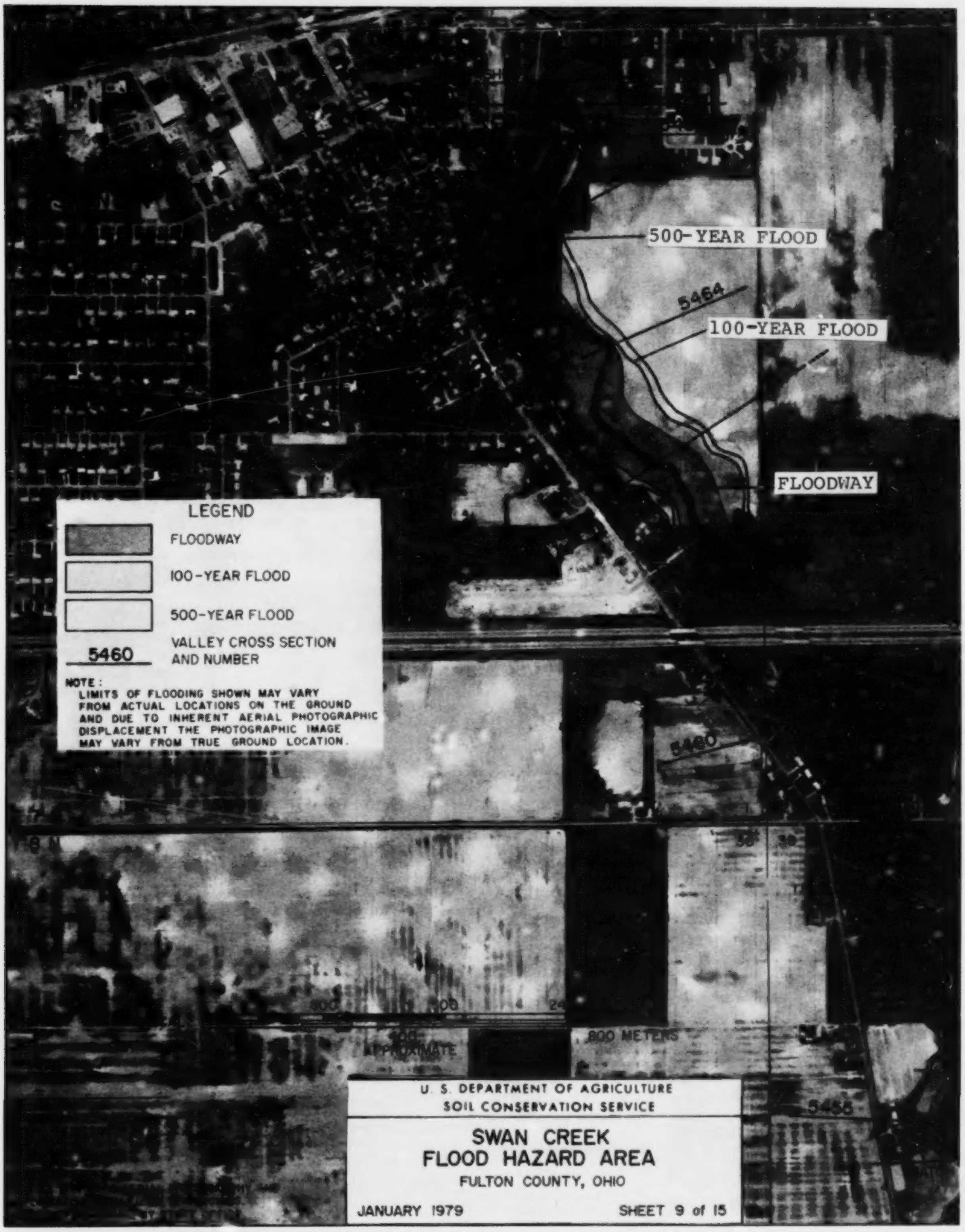

FLOOD HAZARD AREA LIMIT
MATCH LINE
PLATE BC-1
MATCH LINE
PLATE MX-3
FLOODWAY LIMIT
FLOODWAY LIMIT
MATCH LINE
PLATE M
FLOOD HAZARD AREA LIMIT
1050+00
1060+00
1070+00
1080+00
1100+00
1120+00
EXAS
PLAN
200 0 200 400 600
SCALE IN FEET

STATE OF NEW JERSEY
DEPARTMENT of CONSERVATION
&
ECONOMIC DEVELOPMENT
DIVISION of WATER POLICY and SUPPLY
DELINEATION OF FLOODWAY
AND FLOOD HAZARD AREA
MATCHAPONIX BROOK
STA.1050+00 TO STA.1130+00
MADISON TOWNSHIP, MONROE TOWNSHIP
Middlesex County, New Jersey

Anderson-Nichols & Co.
Boston, Mass.

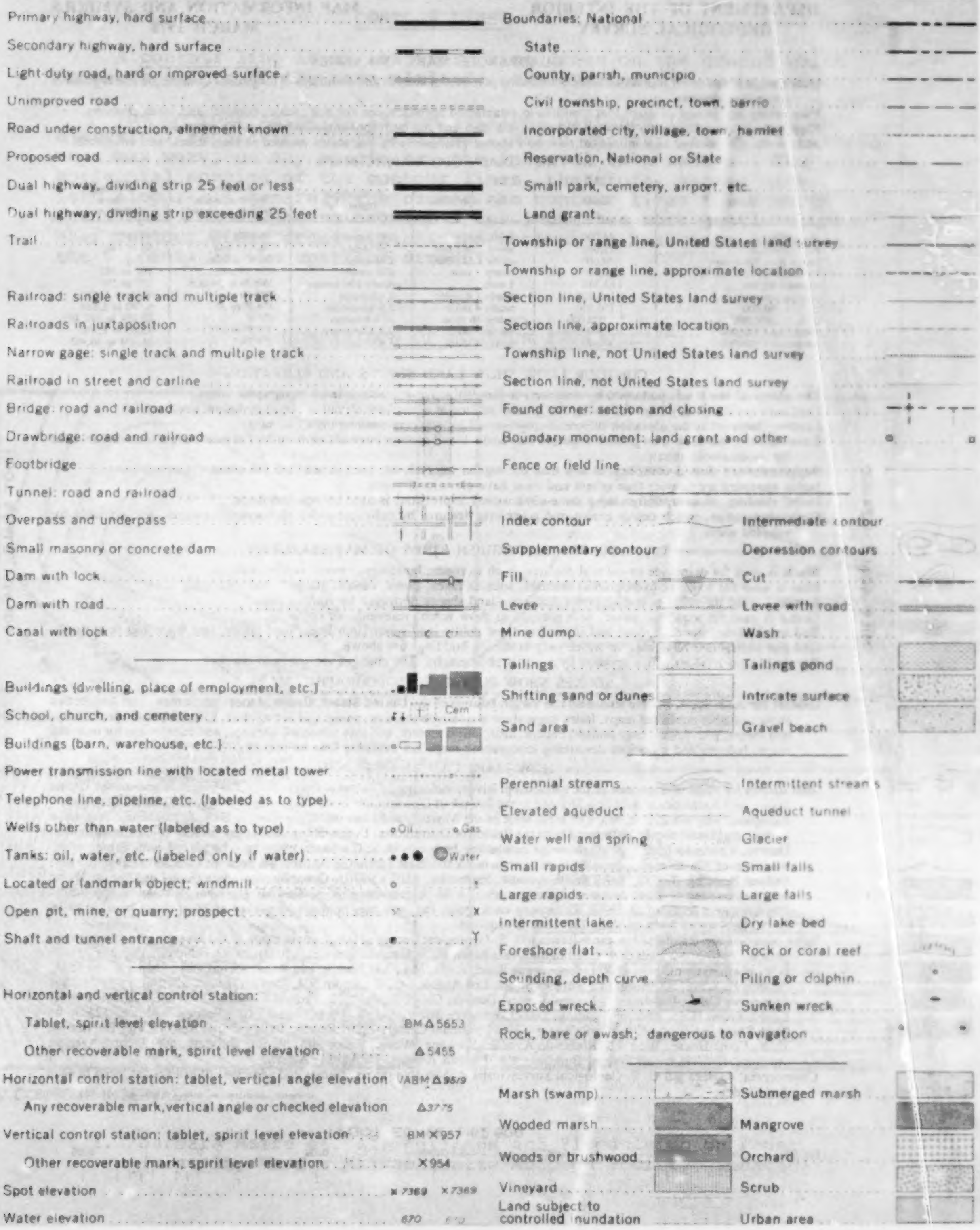
PLATE MX-4

FLOODPLAIN DELINEATION ON AN ORTHOPHOTO MAP


500-YEAR FLOOD
5464
100-YEAR FLOOD
FLOODWAY
LEGEND
FLOODWAY
100-YEAR FLOOD
500-YEAR FLOOD
5460 VALLEY CROSS SECTION AND NUMBER
NOTE: LIMITS OF FLOODING SHOWN MAY VARY FROM ACTUAL LOCATIONS ON THE GROUND AND DUE TO INHERENT AERIAL PHOTOGRAPHIC DISPLACEMENT THE PHOTOGRAPHIC IMAGE MAY VARY FROM TRUE GROUND LOCATION.
5460
400 APPROXIMATE
800 METERS
5456
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
SWAN CREEK
FLOOD HAZARD AREA
FULTON COUNTY, OHIO
JANUARY 1979
SHEET 9 of 15

TOPOGRAPHIC MAP SYMBOLS

VARIATIONS WILL BE FOUND ON OLDER MAPS



Primary highway, hard surface
Secondary highway, hard surface
Light-duty road, hard or improved surface
Unimproved road
Road under construction, alinement known
Proposed road
Dual highway, dividing strip 25 feet or less
Dual highway, dividing strip exceeding 25 feet
Trail

Railroad: single track and multiple track
Railroads in juxtaposition
Narrow gage: single track and multiple track
Railroad in street and carline
Bridge: road and railroad
Drawbridge: road and railroad
Footbridge
Tunnel: road and railroad
Overpass and underpass
Small masonry or concrete dam
Dam with lock
Dam with road
Canal with lock

Buildings (dwelling, place of employment, etc.)
School, church, and cemetery — Cem
Buildings (barn, warehouse, etc.)
Power transmission line with located metal tower
Telephone line, pipeline, etc. (labeled as to type)
Wells other than water (labeled as to type) — Oil, Gas
Tanks: oil, water, etc. (labeled only if water) — Water
Located or landmark object; windmill
Open pit, mine, or quarry; prospect
Shaft and tunnel entrance

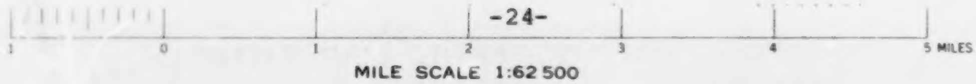
Horizontal and vertical control station:
Tablet, spirit level elevation — BM△5653
Other recoverable mark, spirit level elevation — △5455
Horizontal control station: tablet, vertical angle elevation — VABM△95/9
Any recoverable mark, vertical angle or checked elevation — △3775
Vertical control station: tablet, spirit level elevation — BM×957
Other recoverable mark, spirit level elevation — ×954
Spot elevation — ×7369 ×7369
Water elevation — 670 670

Boundaries: National
State
County, parish, municipio
Civil township, precinct, town, barrio
Incorporated city, village, town, hamlet
Reservation, National or State
Small park, cemetery, airport, etc.
Land grant
Township or range line, United States land survey
Township or range line, approximate location
Section line, United States land survey
Section line, approximate location
Township line, not United States land survey
Section line, not United States land survey
Found corner: section and closing
Boundary monument: land grant and other
Fence or field line

Index contour — Intermediate contour
Supplementary contour — Depression contours
Fill — Cut
Levee — Levee with road
Mine dump — Wash
Tailings — Tailings pond
Shifting sand or dunes — Intricate surface
Sand area — Gravel beach

Perennial streams — Intermittent streams
Elevated aqueduct — Aqueduct tunnel
Water well and spring — Glacier
Small rapids — Small falls
Large rapids — Large falls
Intermittent lake — Dry lake bed
Foreshore flat — Rock or coral reef
Sounding, depth curve — Piling or dolphin
Exposed wreck — Sunken wreck
Rock, bare or awash; dangerous to navigation

Marsh (swamp) — Submerged marsh
Wooded marsh — Mangrove
Woods or brushwood — Orchard
Vineyard — Scrub
Land subject to controlled inundation — Urban area



2 MILES
1
0
5
MILE SCALE 1:24 000

1000
0
5000
10 000
15000 FEET
FOOT SCALE 1:24 000

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

TOPOGRAPHIC
MAP INFORMATION AND SYMBOLS
MARCH 1978

QUADRANGLE MAPS AND SERIES

Quadrangle maps cover four-sided areas bounded by parallels of latitude and meridians of longitude. Quadrangle size is given in minutes or degrees.

Map series are groups of maps that conform to established specifications for size, scale, content, and other elements.

Map scale is the relationship between distance on a map and the corresponding distance on the ground.

Map scale is expressed as a numerical ratio and shown graphically by bar scales marked in feet, miles, and kilometers.

NATIONAL TOPOGRAPHIC MAPS

Series	Scale	1 inch represents	1 centimeter represents	Standard quadrangle size (latitude-longitude)	Quadrangle area (square miles)
7½-minute	1:24,000	2,000 feet	240 meters	7½×7½ min.	49 to 70
7½×15-minute	1:25,000	about 2,083 feet	250 meters	7½×15 min.	98 to 140
Puerto Rico 7½-minute	1:20,000	about 1,667 feet	200 meters	7½×7½ min.	71
15-minute	1:62,500	nearly 1 mile	625 meters	15×15 min.	197 to 282
Alaska 1:63,360	1:63,360	1 mile	nearly 634 meters	15×20 to 36 min.	207 to 281
Intermediate	1:100,000	nearly 1.6 miles	1 kilometer	30×60 min.	1568 to 2240
U. S. 1:250,000	1:250,000	nearly 4 miles	2.5 kilometers	1°×2° or 3°	4,580 to 8,669
U. S. 1:1,000,000	1:1,000,000	nearly 16 miles	10 kilometers	4°×6°	73,734 to 102,759
Antarctica 1:250,000	1:250,000	nearly 4 miles	2.5 kilometers	1°×3° to 15°	4,089 to 8,336
Antarctica 1:500,000	1:500,000	nearly 8 miles	5 kilometers	2°×7½°	28,174 to 30,462

CONTOUR LINES SHOW LAND SHAPES AND ELEVATION

The shape of the land, portrayed by contours, is the distinctive characteristic of topographic maps.

Contours are imaginary lines following the ground surface at a constant elevation above or below sea level.

Contour interval is the elevation difference represented by adjacent contour lines on maps.

Contour intervals depend on ground slope and map scale. Small contour intervals are used for flat areas; larger intervals are used for mountainous terrain.

Supplementary dotted contours, at less than the regular interval, are used in selected flat areas.

Index contours are heavier than others and most have elevation figures.

Relief shading, an overprint giving a three-dimensional impression, is used on selected maps.

Orthophotomaps, which depict terrain and other map features by color-enhanced photographic images, are available for selected areas.

COLORS DISTINGUISH KINDS OF MAP FEATURES

Black is used for manmade or cultural features, such as roads, buildings, names, and boundaries.

Blue is used for water or hydrographic features, such as lakes, rivers, canals, glaciers, and swamps.

Brown is used for relief or hypsographic features—land shapes portrayed by contour lines.

Green is used for woodland cover, with patterns to show scrub, vineyards, or orchards.

Red emphasizes important roads and is used to show public land subdivision lines, land grants, and fence and field lines.

Red tint indicates urban areas, in which only landmark buildings are shown.

Purple is used to show office revision from aerial photographs. The changes are not field checked.

INDEXES SHOW PUBLISHED TOPOGRAPHIC MAPS

Indexes for each State, Puerto Rico and the Virgin Islands of the United States, Guam, American Samoa, and Antarctica show available published maps. Index maps show quadrangle location, name, and survey date. Listed also are special maps and sheets, with prices, map dealers, Federal distribution centers, and map reference libraries, and instructions for ordering maps. Indexes and a booklet describing topographic maps are available free on request.

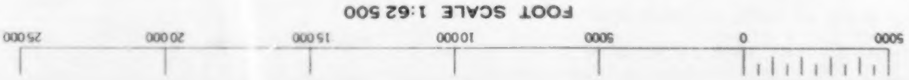
HOW MAPS CAN BE OBTAINED

Mail orders for maps of areas east of the Mississippi River, including Minnesota, Puerto Rico, the Virgin Islands of the United States, and Antarctica should be addressed to the Branch of Distribution, U. S. Geological Survey, 1200 South Eads Street, Arlington, Virginia 22202. Maps of areas west of the Mississippi River, including Alaska, Hawaii, Louisiana, American Samoa, and Guam should be ordered from the Branch of Distribution, U. S. Geological Survey, Box 25286, Federal Center, Denver, Colorado 80225. A single order combining both eastern and western maps may be placed with either office. Residents of Alaska may order Alaska maps or an index for Alaska from the Distribution Section, U. S. Geological Survey, Federal Building-Box 12, 101 Twelfth Avenue, Fairbanks, Alaska 99701. Order by map name, State, and series. On an order amounting to $300 or more at the list price, a 30-percent discount is allowed. No other discount is applicable. Prepayment is required and must accompany each order. Payment may be made by money order or check payable to the U. S. Geological Survey. Your ZIP code is required.

Sales counters are maintained in the following U. S. Geological Survey offices, where maps of the area may be purchased in person: 1200 South Eads Street, Arlington, Va.; Room 1028, General Services Administration Building, 19th & F Streets NW, Washington, D. C.; 1400 Independence Road, Rolla, Mo.; 345 Middlefield Road, Menlo Park, Calif.; Room 7638, Federal Building, 300 North Los Angeles Street, Los Angeles, Calif.; Room 504, Custom House, 555 Battery Street, San Francisco, Calif.; Building 41, Federal Center, Denver, Colo.; Room 1012, Federal Building, 1961 Stout Street, Denver Colo.; Room 1C45, Federal Building, 1100 Commerce Street, Dallas, Texas; Room 8105, Federal Building, 125 South State Street, Salt Lake City, Utah; Room 1C402, National Center, 12201 Sunrise Valley Drive, Reston, Va.; Room 678, U. S. Court House, West 920 Riverside Avenue, Spokane, Wash.; Room 108, Skyline Building, 508 Second Avenue, Anchorage, Alaska; and Federal Building, 101 Twelfth Avenue, Fairbanks, Alaska.

Commercial dealers sell U. S. Geological Survey maps at their own prices. Names and addresses of dealers are listed in each State index.

INTERIOR—GEOLOGICAL SURVEY, RESTON, VIRGINIA—1978

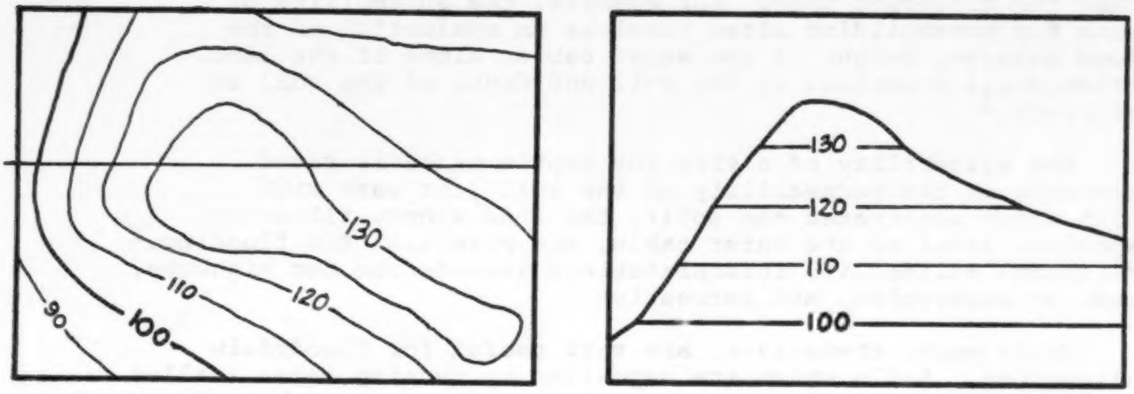


CONTOUR LINES

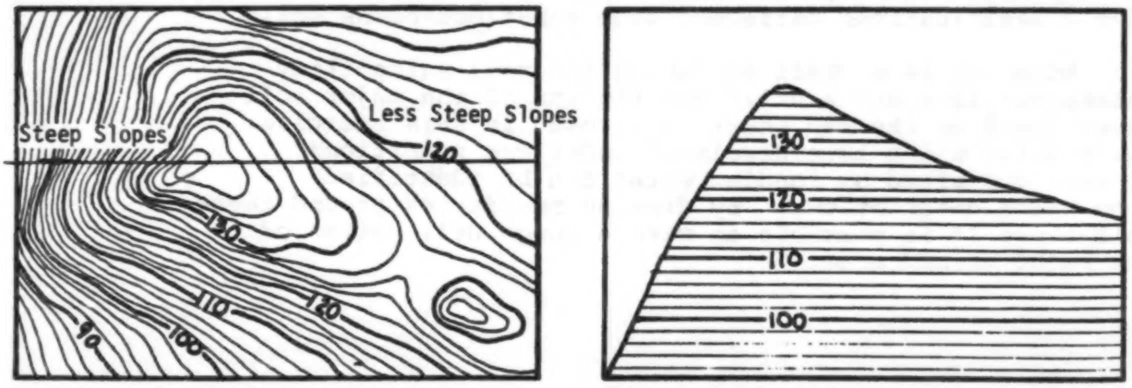
A contour line is an imaginery line drawn on the ground which connects points of the same altitude or elevation.

The contour interval is the vertical distance (difference in elevation) separating contour lines. While contour intervals between maps may vary, on any single map the interval is constant. The horizontal spacing of the contour lines, therefore, varies with land slope. In general, the closer the contour lines the steeper the slope. Wide spacing between lines indicates more gentle slopes. When contour lines cross streams the contour is bent into a V, the V points in the upstream direction.

COMPARISON OF CONTOUR INTERVALS [1]


130
120
110
100
90
130
120
110
100

10' CONTOUR INTERVAL.


Steep Slopes
Less Steep Slopes
120
130
110
120
90
100
130
120
110
100

2' CONTOUR INTERVAL.

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1. Barbara Maire et. al, Wetlands and Floodplains on Paper (Lincoln, Mass.: Massachusetts Audubon Society, undated)

THE SOIL SURVEY

Man is dependent on soils. Soils provide the habitat for plants and crops; the foundations for buildings and roads; and receptacles for domestic, municipal, industrial and animal wastes. Soil management should be a fundamental planning concern and the soil survey is an essential planning tool. The soil survey, conducted by the Soil Conservation Service, provides the basic information needed for planning including: a map depicting different soil types and a description of the properties and limitations of these soils.

Of particular interest for land use planning are the soil's "engineering properties" and "engineering interpretations." These interpretations indicate the suitability of areas for different uses. For example, the suitability of areas for homebuilding sites involves an evaluation of the flood hazards, height of the water table, slope of the land, shrink-swell potential of the soil and depth of the soil to hard rock.[1]

The suitability of a site for septic tanks is rated according to the permeability of the soil (the ease with which water penetrates the soil), the land slope, filtering capacity, level of the water table, and potential for flooding.[2] Additional suitability interpretations include use for highways, ponds or reservoirs, and recreation.

Soils maps, themselves, are very useful for floodplain delineation. Soils which are deposited by running water (called alluvial soils) or soils which are frequently covered by water differ in texture, color, or structure from those which develop under drier conditions. Such soils will, therefore, have classifications different from non-flood-prone soils.

Attached is a chart depicting the soil suitability interpretations and a brief description of the major soil types found on the map sheet to be used in this exercise. Those soils which have developed under wet conditions or were deposited by running water can be identified from these descriptions. By drawing boundaries around these soil types it is possible to make a rough delineation of the flood hazard area.

1. U.S. Department of Agriculture, Soil Conservation Service, Soil Survey For Wake County, North Carolina. (Washington, D.C.: GPO, 1970)

2. Ibid.

KEY

ZONING:

45	Residential
46	Commercial
47	Heavy Industrial
48	Light Industry
49	Forest Agriculture
50	Conservation/Preservation
51	Historic Building District
52	Mobile Home
53	Destination Park
54	Planned Development
71	Port/GAPC
99	Unclassified and/or Water

DEVELOPMENT.

110	Resident
120	Retail/W
130	Industri
140	Extracti
150	Transpor
160	Institut
190	Open and Urban
200	Agricult

SOILS:

10	Leon
12	Eunola
13	Bladen
18	Cape Fear
20	Centenary
27	Rutlege
28	Echaw
34	Johnston
50	Lynn-Haven
54	Chipley
55	Witherbee
57	Grifton (Ogeechee)
59	Wahee
61	Yemassee
251	Wakulla
602	Lakeland (Wando)
500	Open Water
99	Unclassified

WETLANDS:

400	Forest
440	Logged A Brush
500	Open Wat
510	Impoundm
610	Forested
620	Unforest
621	Sale Mar
623	Brackish
624	Fresh Wa
630	Abandone
	631 Lo
	632 Hi
	633 Br
	634 Fr
720	Beach

SOILS: GEORGETOWN SOUTH, S.C.

Leon (10)
Poorly drained sandy soils with slopes less than 5%.

Eulonia (12)
Deep moderately well drained soils on the lower coastal plain. Slopes less than 2%.

Bladen (13)
Poorly drained soils occurring on broad nearly level flats of the coastal plains.

Cape Fear (18)
Nearly level, very poorly drained soils on stream terraces and low uplands of the coastal plain. Flooding of brief duration is frequent from January to May.

Centenary (20)
Sandy, moderately well drained, rapidly permeable soils of the coastal plain. Slopes are less than 2%.

Rutlege (27)
Deep, very poorly drained soils of upland flats and in depressions. Slopes are less than 2%. Flooding of brief duration is frequent.

Echaw (28)
Moderately well drained, permeable soils on level eroded ridges and flats of the lower coastal plain.

Johnston (34)
Very poorly drained soils on nearly level flood plains of the coastal plain. Flooding, sometimes of long duration, is common.

Lynn Haven (50)
Poorly drained sandy soils with slopes of less than 2%.

Witherbee (55)
Sandy, somewhat poorly drained, rapidly permeable soils on nearly level broad ridges and flats of the lower coastal plain. Slopes of less than 2%.

Grifton (57)
Poorly drained soils on the middle and lower coastal plain uplands and stream terraces. Slopes are generally less than 2%.

Wahee (59)
Poorly drained, slowly permeable, soils of the coastal plains. Slope range to 4%. Flooding, of brief duration, is common on some of these soils.

Yemassee (61)
Poorly drained, nearly level soils on the lower coastal plain. Some rare flooding.

Wakulla (251)
Nearly level to sloping, well drained soils on upland and stream terraces of the coastal plain. Slopes range from 0-10%.

Lakeland (602)
Very well drained nearly level to steep soils on coastal plain uplands. Slopes range from 0 to 30%.

SOIL SURVEY - GEORGETOWN COUNTY, SOUTH CAROLINA

SOIL SERIES AND MAP SYMBOL	DEGREE OF LIMITATION FOR -					
			RECREATION			
	SEPTIC TANK ABSORPTION FIELDS	HOMEBUILDING SITES	CAMPSITES	PICNIC AREAS	PLAYGROUNDS	TRAILS
Leon (10)	Severe: wetness, poor filter	Severe, wetness	Severe: wetness, too sandy	Severe: wetness too sandy	Severe: wetness too sandy	Severe: wetness, too sandy
Eulonia (12)	Severe: wetness	Severe - moderate: wetness	Moderate	Moderate	Moderate	Moderate
Bladen (13)	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Cape Fear (18)	Severe: wetness, floods	Severe: wetness, floods	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Centenary (20)	Severe: wetness, poor filter	Severe - moderate: wetness	Severe: too sandy	Severe: too sandy	Severe: too sandy	Severe: too sandy
Rutlege (27)	Severe: wetness, floods	Severe: wetness, Floods	Severe: wetness, floods	Severe: wetness	Severe: wetness, too sandy	Severe: wetness
Echaw (28)	Severe: wetness, poor filter	Moderate - slight	Severe: too sandy	Severe: too sandy	Severe: too sandy	Severe: too sandy
Johnston (34)	Severe: floods, ponding, poor filter	Severe: floods, ponding	Severe: floods, ponding	Severe: ponding	Severe: ponding, floods	Severe: ponding
Lynn Haven (50)	Severe: wetness, poor filter	Severe, wetness	Severe: wetness, too sandy	Severe: wetness, too sandy	Severe: wetness, too sandy	Severe: wetness, too sandy
Witherbee (55)	Severe: wetness, poor filter	Severe: wetness	Severe: wetness. too sandy	Severe: wetness too sandy	Severe: wetness, too sandy	Severe: wetness, too sandy

SOIL SERIES AND MAP SYMBOL	DEGREE OF LIMITATION FOR -					
	SEPTIC TANK ABSORPTION FIELDS	HOMEBUILDING SITES	RECREATION			
			CAMPSITES	PICNIC AREAS	PLAYGROUNDS	TRAILS
Grifton (57)	Severe: wetness,	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Wahee (59)	Severe: floods, wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Yemassee (61)	Severe: wetness	Severe: wetness, some flooding	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness
Wakulla (251)	Slight	Slight	Severe: too sandy	Severe: too sandy	Severe: too sandy	Severe: too sandy
Lakeland (602)	Severe: poor filter	Slight	Severe: too sandy	Severe: too sandy	Severe: too sandy	Severe: too sandy

DAY TWO

8:30 a.m. FLOOD HAZARD MANAGEMENT: THREE STORIES

Purposes:

- To create a mood of excitement regarding the opportunities to develop flood hazard management strategies to meet a variety of goals.
- To introduce some of the ways in which the National Flood Insurance Program provides assistance to the community.

Activity:

- CF slide presentation.

NOTES:

8:45 a.m. **DESIGNING A FLOOD HAZARD MANAGEMENT PROGRAM IDENTIFYING GOALS, OPPORTUNITIES AND STRATEGIES**

Purpose:

- To reinforce the varying opportunities for flood hazard management presented by the slide show.
- To relate these opportunities to the pre- and post-flood stages of flood hazard management.
- To highlight the importance of local initiative in taking advantage of various state and federal assistance.
- To relate various opportunities and strategies described in slide show to goals described in preceding days session and still taped to wall of plenary session room.

Activity:

- Small group discussions within plenary session.
- Completion of Exercise B.

Review Questions

1. What are the variety of goals that the communities in the slide show tried to achieve?
2. What were the obstacles that those communities had to overcome? How did they overcome these obstacles?
3. What factors should be considered in developing a community flood hazard management program?
4. What approaches best address problems of existing development within the flood hazard area?
5. What approaches are best to control new development?

6. What kinds of federal/state/local assistance are available to assist communities?

7. What are the differing opportunities available to communities regarding their developed land versus their undeveloped land? What are the differing opportunities available before or between floods, or after a major flood?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapter III.

NOTES:

EXERCISE B

1. What were the goals of the flood hazard management programs adopted by the three communities in the slide show?

	Montgomery County	Baltimore County	Sanibel Island
Goals			

How do these goals relate to the general list of goals developed in the previous session?

2. What opportunities did each of the communities explore in developing their flood hazard management programs and to what stage (pre-flood or post-flood) of flood hazard Management?

Were the programs directed?

	Montgomery County	Baltimore County	Sanibel Island
Opportunities			
Flood Hazard Management stage addressed			

EXERCISE B (continued)

3. What specific strategies did each community adopt to implement their flood hazard management plan?

   To what extent were federal and state agencies involved?

   What additional assistance might have been employed in each of the community situations?

	Montgomery County	Baltimore County	Sanibel Island
Strategies			
Federal and State Involvement			
Additional Assistance			

9:30 - 10:45 a.m. THE FEDERAL AND STATE FRAMEWORK FOR COMMUNITY FLOOD HAZARD MANAGEMENT DECISION MAKING

Purpose:

- To outline the structure and functions of various Federal and State programs that affect community flood hazard management:
    - The Floodplains and Wetlands Executive Order
    - NFIP
    - Coastal Zone Management
    - State Natural Resource Management
- To relate these various activities to the goals of community flood hazard management previously identified by participants.

Activities:

- Speech
- Roundtable
- Questions and Answers

Review Questions

1. What are the respective responsibilities of the Federal and State governments in flood hazard management.
2. How well are various programs coordinated at the Federal level? How might coordination be improved?
3. What new initiatives are being implemented to improve federal coordination?
4. What are some of the approaches that creative state governments have used to meet their challenge in mitigating flood hazards and protecting natural resources?

5. How do most state governments related their role in flood hazard management to that of the local community?
6. How is the role of the State likely to be affected as the result of new federal initiatives?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapters IV, V and VIII.

NOTES:

10:45 a.m. BREAK

11:00 a.m. THE NATIONAL FLOOD INSURANCE PROGRAM: WHAT IT DOES--WHAT IT DOESN'T DO

Purpose:

- To bring participants to a common level of understanding concerning the specific minimum requirements of the NFIP.
- To familiarize participants with the tools of the NFIP.
- To examine the extent to which the NFIP will help to meet the range of community flood hazard management goals.

Activities:

- Speech
- Roundtable Discussion
- Audience Questions and Answers

Review Questions

1. What are the two phases of the NFIP? How does a community enter the NFIP?
2. What are the basic regulatory concepts and tools of community participation in the NFIP?
3. What are the minimum requirements of participation in the Regular program of the NFIP? What function do they serve?
    (a) What is meant by the Base Flood? 100-Year Flood?
    (b) What is a Flood Hazard Boundary Map, Flood Insurance Study, FIRM Map, Floodway/Flood Boundary Map?
    (c) How are Flood Profiles interpreted?

4. What new inititatives are bein
   for the NFIP Program (1362, co
   total loss, Flood Plains Execut
   How will these initiatives lik
   development of community flood
   management programs?

5. What provisions does the NFIP
   incorporate to protect certain
   ecological resources (sand dun
   swamps, barrier islands)?

References:

Flood Hazard Management and Natur
Protection: Community Action Gui
Chapter IV.

NOTES:

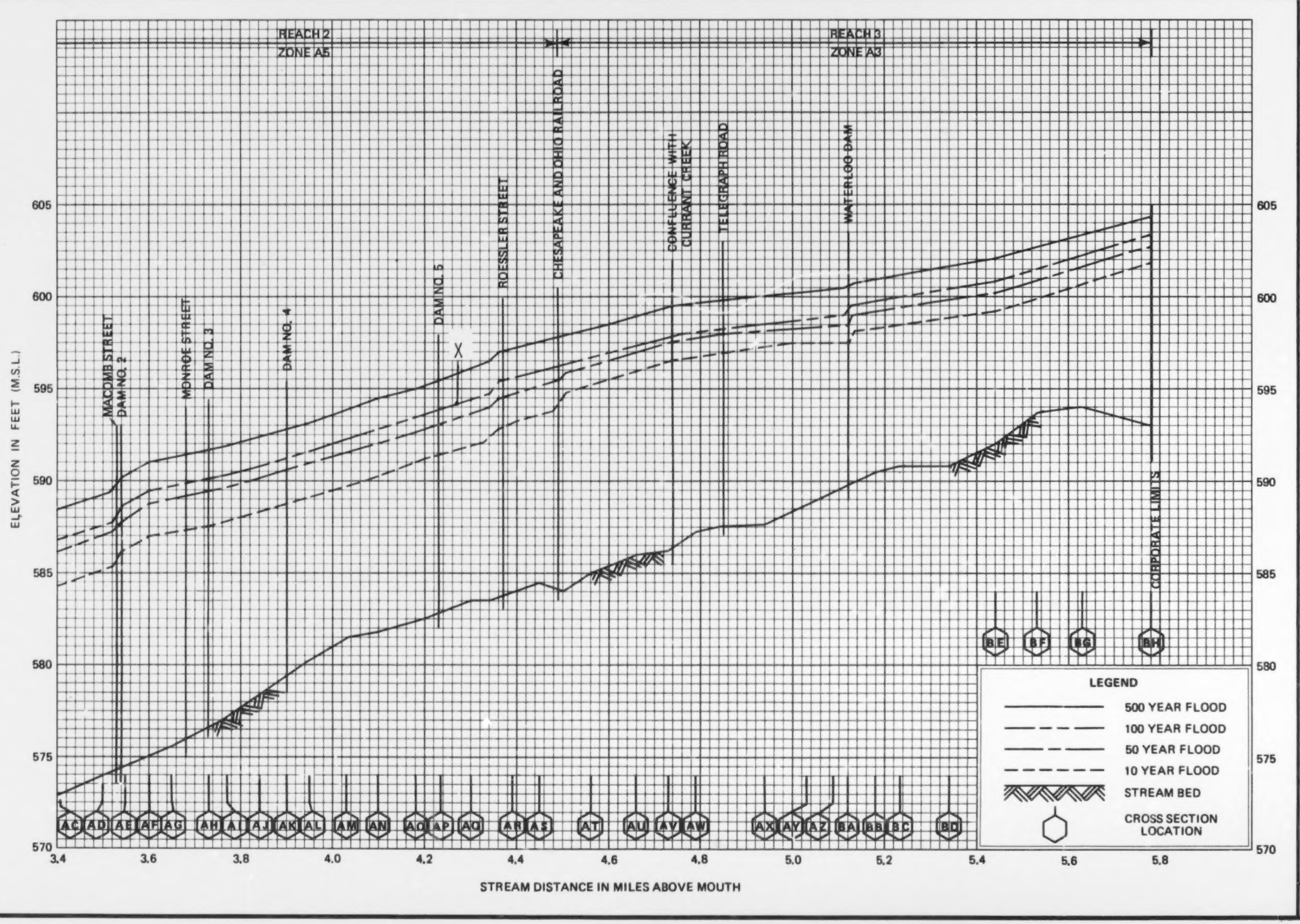
Reading a Profile

Flood profiles, contained in the Flood Insurance Study, typically show cross section elevation of the stream bed and the 10-year, 50-year, 100-year, and 500-year flood.

Scales: On the example opposite, each line on the vertical axis equals 1/2 foot elevation above sea level. On the horizontal axis each line equals .02 miles (approximately 106 feet) of distance above the mouth of the stream.

To locate a site on the horizontal axis: obtain the distance on the ground between the site and a cross section point (<A> -- <A>) For example, Point X is midway between cross sections AP and AQ.

To determine the flood water elevation at that point: locate the point on the flood line you're interested in. (Point X is plotted on the 100-year flood line.) Read the vertical axis to obtain the water elevation. The 100-year flood elevation at Point X is 594.1 feet (above mean sea level). To determine by how much a structure should be elevated to be above the base flood, subtract the ground elevation of the site from the flood elevation at the site.



FLOOD PROFILES

RIVER RAISIN

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

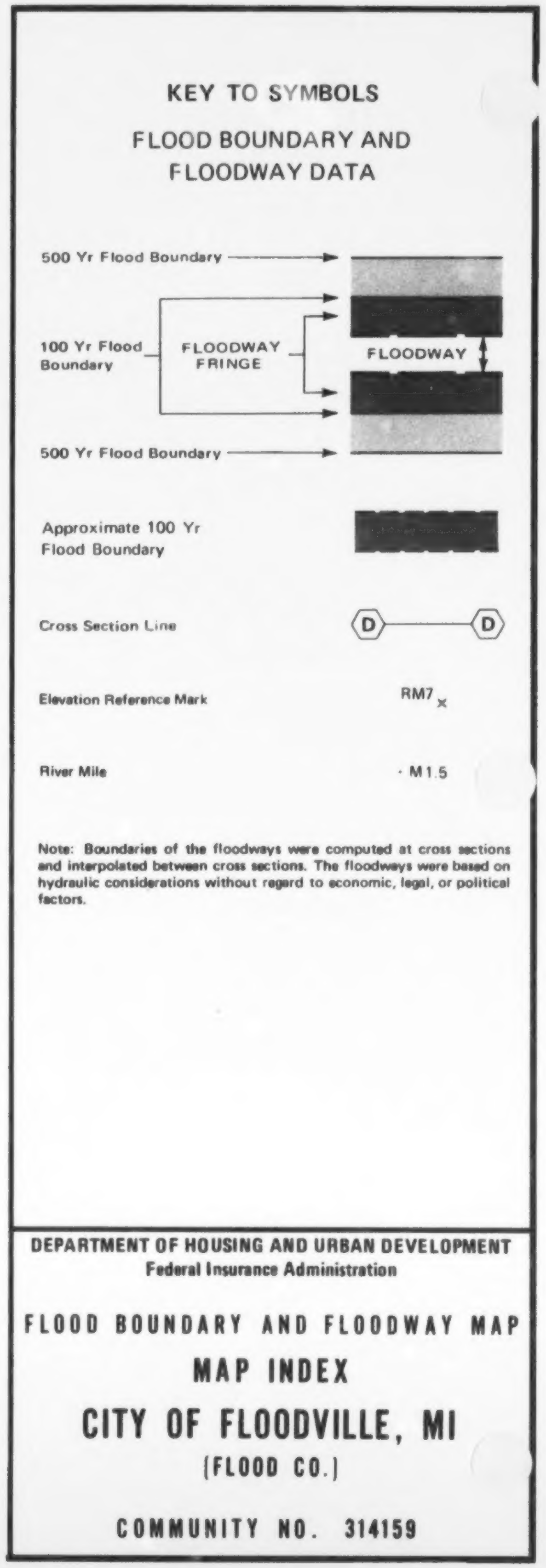
CITY OF FLOODVILLE, MI
(FLOOD CO.)

03P

Reading a Flood Boundary and Floodway Map

A Flood Boundary and Floodway Map identifies the boundaries of the floodway and the 100-year, and 500-year flood. The map also indicates the location of stream cross sections (<Ā> --- <Ā>). With references to the Flood Profile specific flood elevations may be determined at any site.

To locate a site on the map: Obtain the ground distance between the site and two or more points identified on the map (i.e., center-line of a street, bridge or reference mark). Convert the ground distances to map distances and plot the site on the map. Example: Point X is 200 feet west of the intersection of Lavender and Elm Streets and 200 feet southeast of the intersection of Rosessler and Elm Streets. Point X is not within the floodway.



KEY TO SYMBOLS

FLOOD BOUNDARY AND
FLOODWAY DATA

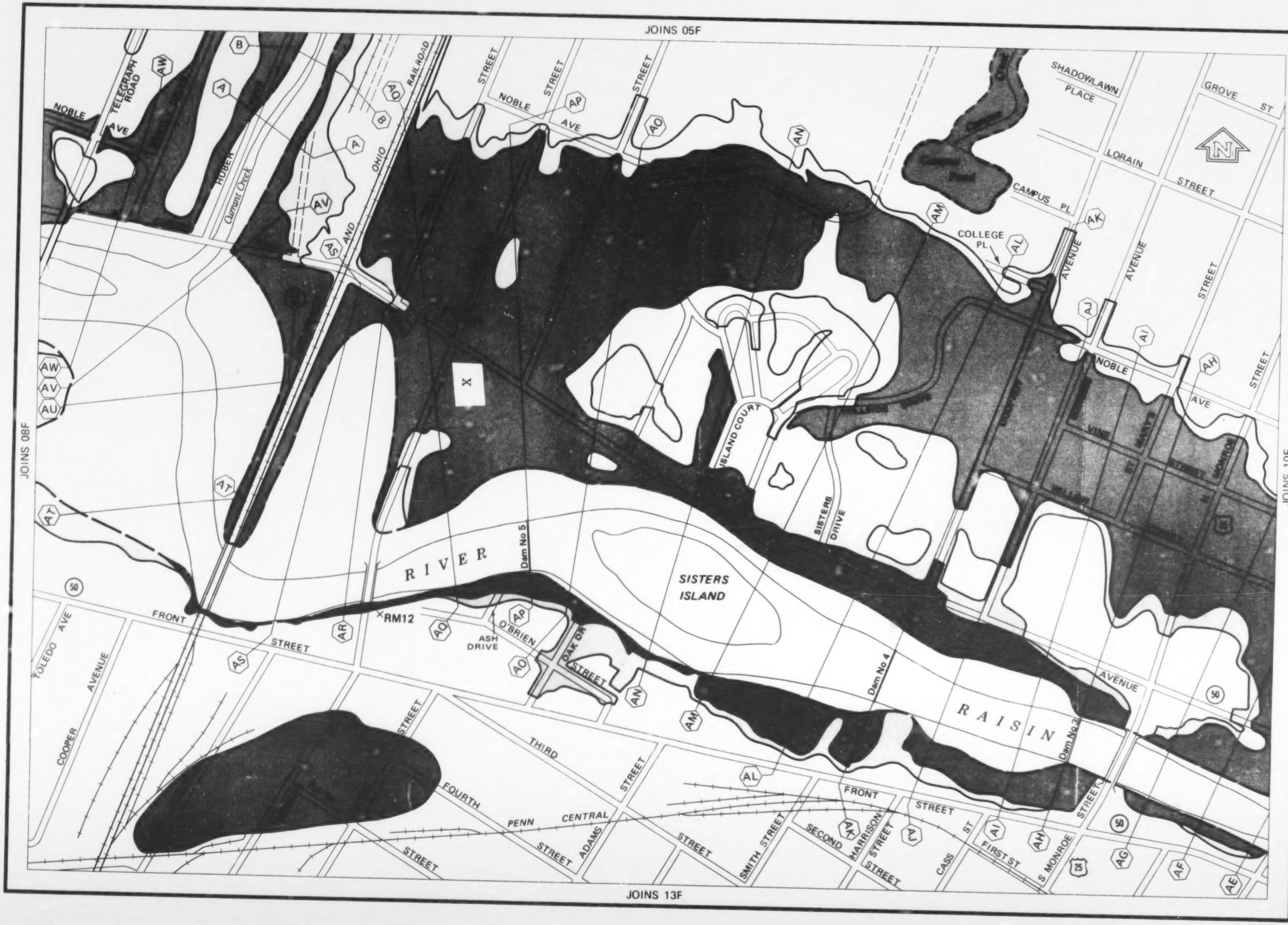
500 Yr Flood Boundary
100 Yr Flood Boundary
FLOODWAY FRINGE
FLOODWAY
500 Yr Flood Boundary
Approximate 100 Yr Flood Boundary
Cross Section Line
D
D
Elevation Reference Mark
RM7 ×
River Mile
· M1.5

Note: Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations without regard to economic, legal, or political factors.

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

FLOOD BOUNDARY AND FLOODWAY MAP
MAP INDEX
CITY OF FLOODVILLE, MI
(FLOOD CO.)

COMMUNITY NO. 314159


JOINS 05F
JOINS 08F
JOINS 10F
JOINS 13F
NOBLE AVE
TELEGRAPH ROAD
HUBER
Current Creek
OHIO AND RAILROAD
STREET
NOBLE STREET AVE
SHADOWLAWN PLACE
GROVE ST
LORAIN STREET
CAMPUS PL
COLLEGE PL
AVENUE
NOBLE AVE
STREET
ISLAND COURT
SISTERS DRIVE
VINE
ST MARY'S
STREET
MONROE
RIVER
RAISIN
Dam No 5
Dam No 4
Dam No 3
SISTERS ISLAND
RM12
O'BRIEN
ASH DRIVE
OAK DR
STREET
FRONT STREET
TOLEDO AVE
COOPER AVENUE
THIRD
FOURTH
PENN CENTRAL
ADAMS STREET
SMITH STREET
SECOND
HARRISON STREET
FRONT STREET
CASS ST
FIRST ST
S MONROE
STREET
50
25
X
A
B
AE
AF
AG
AH
AI
AJ
AK
AL
AM
AN
AO
AP
AQ
AR
AS
AT
AU
AV
AW
N
APPROXIMATE SCALE
400 0 400 800 1200 FEET

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF FLOODVILLE, MI
(FLOOD CO.)

FLOOD BOUNDARY AND FLOODWAY MAP

09F

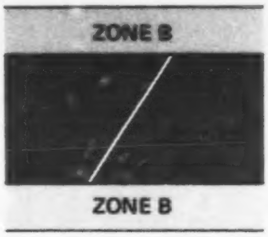
Reading a Flood Insurance Rate Map

The Flood Insurance Rate Map (FIRM) indicates the risk zones (for insurance purposes) within the flood hazard area, and map representations of 100-year flood elevation. Use the flood profile for specific site elevations.

Point X is within insurance rate zone A5.

KEY TO SYMBOLS

ZONE DESIGNATIONS* WITH DATE OF IDENTIFICATION
ie., 12/2/74



Base Flood Elevation Line with elevation in feet	~~~~~~~513~~~~~~
Base Flood Elevation where uniform within zone	(EL 987' MSL)
Elevation Reference Mark	RM7 ×
River Mile	· M1.5

***EXPLANATION OF ZONE DESIGNATIONS**

A flood insurance map displays the zone designations for a community according to areas of designated flood hazards. The zone designations used by FIA are:

Zone	Explanation
A	Areas of 100-year flood; base flood elevations and flood hazard factors not determined.
A0	Areas of 100-year shallow flooding; flood depth 1 to 3 feet; product of flood depth (feet) and velocity (feet per second) less than 15.
A1 - A30	Areas of 100-year flood; base flood elevations and flood hazard factors determined.
A69	Areas of 100-year flood to be protected by a flood protection system under construction; base flood elevations and flood hazard factors not determined.
B	Area between limits of 100-year flood and 500-year flood; areas of 100-year shallow flooding where depths less than 1 foot.
C	Areas outside 500-year flood.
D	Areas of undetermined, but possible, flood hazards.
V	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors not determined.
V0	Areas of 100-year shallow flooding with velocity; flood depth 1 to 3 feet; product of depth (feet) and velocity (feet per second) more than 15.
V1 - V30	Areas of 100-year coastal flood with velocity (wave action); base flood elevations and flood hazard factors determined.

CONSULT NFIA SERVICING COMPANY OR LOCAL INSURANCE AGENT OR BROKER TO DETERMINE IF PROPERTIES IN THIS COMMUNITY ARE ELIGIBLE FOR FLOOD INSURANCE.

INITIAL IDENTIFICATION DATE:
FEBRUARY 1, 1975

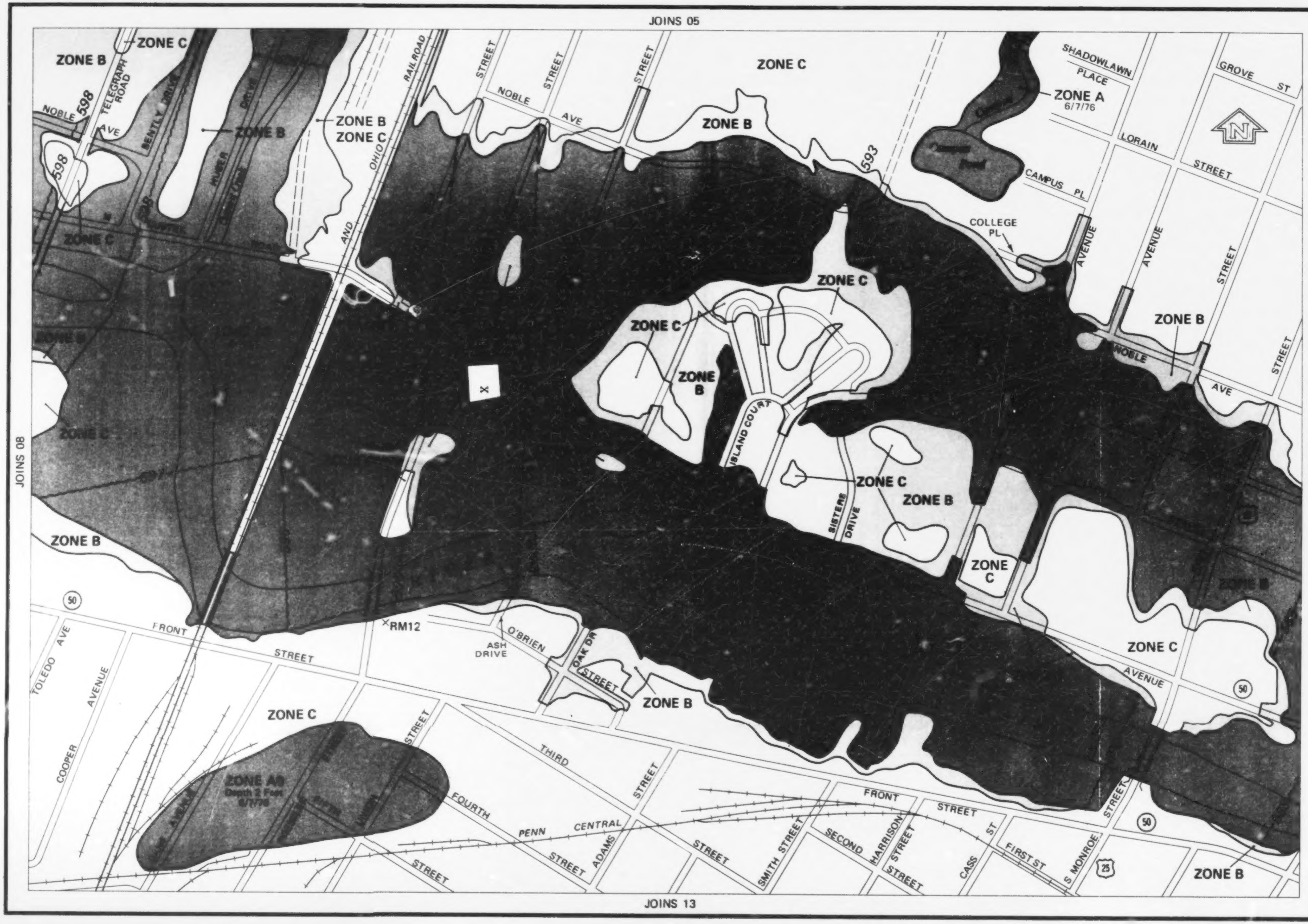
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

FLOOD HAZARD BOUNDARY MAP H - 01 - 23
FLOOD INSURANCE RATE MAP I - 01 - 23

MAP INDEX

CITY OF FLOODVILLE, MI
(FLOOD CO.)

COMMUNITY NO. 314159


JOINS 05
JOINS 08
JOINS 10
JOINS 13
ZONE B
ZONE C
ZONE A
6/7/76
ZONE A8
Depth 2 Feet
6/7/76
ZONE B
ZONE C
TELEGRAPH ROAD
NOBLE AVE
BENTLY DRIVE
HUBER DRIVE
OHIO AND RAILROAD
STREET
NOBLE AVE
SHADOWLAWN PLACE
GROVE ST
LORAIN STREET
CAMPUS PL
COLLEGE PL
AVENUE
STREET
NOBLE AVE
ISLAND COURT
SISTERS DRIVE
FRONT STREET
RM12
O'BRIEN STREET
ASH DRIVE
OAK DR
TOLEDO AVE
COOPER AVENUE
FOURTH STREET
THIRD STREET
PENN CENTRAL
ADAMS STREET
SMITH STREET
SECOND STREET
HARRISON STREET
CASS ST
FIRST ST
S. MONROE STREET
AVENUE
598
593
597
50
25
X
N

FEDERAL EMERGENCY MANAGEMENT AGENCY
Federal Insurance Administration

CITY OF FLOODVILLE, MI
(FLOOD CO.)

FLOOD HAZARD BOUNDARY MAP H - 09
FLOOD INSURANCE RATE MAP I - 09

APPROXIMATE SCALE
400 0 400 800 1200 FEET

EFFECTIVE DATE

H&I-09

12:15 p.m. LUNCH

1:30 FLOOD HAZARD MANAGEMENT: ISSUES AND P

Purpose:

- To allow participants to explore i
  detail the various issue and progr
  described in the morning sessions.

Activity:

- Concurrent small group sessions in
  following areas:

  -- building standards;
  -- NFIP regulations;
  -- 1362;
  -- flood hazard mapping;
  -- Coastal Zone Management

Review Questions

A. Building Standards

1. What requirements of the NFIP rela
   buildings? Do these requirements
   deal with the impact of floods or
   they also address other special ne
   of building in hurricane prone are

2. What specific provisions should be
   in local building codes to insure
   elevated new structures are built
   withstand hurricane force winds? s
   driven waves?

3. What lessons can be learned from e
   in communities recently hit by hur
   (Gulf Shores, Alabama, Dauphin Isl
   Mississippi)?

4. What problems might building inspe
   anticipate in enforcing standards?

5. How do building requirements of the
   relate to the acturially based ins
   rates used by FEMA in coastal high
   areas?

B. NFIP Regulations

1. What are the minimum requirements of the NFIP (Regular Phase) in terms of elevations, construction, and land use?

2. What specific requirements does the NFIP pose for new construction in the high velocity zone?

3. On what basis have elevation requirements been established in the past? How will wave heights be factored into the formula for establishing actuarial rates for new construction?

4. To what extent are barrier islands, dunes, and other fragile coastal ecosystems protected under the NFIP regulations?

C. Section 1362 (Post Disaster Acquisition/ Relocation under NFIP)

1. What is Section 1362? What are its major provisions?

2. How is Section 1362 being implemented currently? How much money has been appropriated?

3. How is eligibility for 1362 funds determined? What procedures must communities follow to acquire 1362 funds?

4. What restrictions are placed on the use of 1362 funds?

D. Flood Hazard Mapping

1. What role do maps play in the NFIP?

2. What is the status of FIA's community mapping process?

3. What is the data base of the community map? What are the sources of possible error in flood hazard boundary mapping? What kinds of changing conditions might affect the communities of flood hazard boundary?

4. What is the process of amending maps to reflect changing conditions?

5. How are existing maps going to be amended to reflect wave height data? How long will the process take? What should communities do in the interim before their maps are amended to regulate new development in high velocity zones?

6. What is the status of the new FIA map locator service?

E. Coastal Zone Management

1. What's being done at the Federal level to coordinate coastal zone management and flood hazard mitigation?

2. How might an approved state coastal zone management plan be useful to a community in achieving flood hazard mitigation goals?

3. What types of assistance are available to communities from the state CZM office?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapters IV, V and VII.

NOTES:

2:30 p.m. BREAK

2:45 - 3:45 p.m. LOCAL STRATEGIES FOR FLOOD HAZARD MITIGATION: CASE EXAMPLES

Purpose:

- To allow participants to examine in detail the way a particular community utilizes a strategy (or set of strategies) to accomplish flood hazard mitigation goals.
- To focus attention on the stages of flood hazard management (pre and post) to which the strategy was applied.
- To highlight the role of various federal, and state programs (NFIP, CZM, WQM) in accomplishing the strategy.
- To relate the strategies to the goals of flood hazard mitigation identified previously.

Activity:

- Concurrent small group sessions on community case examples which address a variety of flood hazard management strategies. For example:

  -- relocation;
  -- recreation/acquisition;
  -- storm water management;
  -- zoning;
  -- critical areas protection;
  -- development with sensitivity to ecosystems.

Review Questions

1. What are the major flooding problems in the community?
2. What are the estimated costs to the community of recurrent floods?

3. What opportunities did the community identify to begin to address their flooding problems? In the pre-flood situation? In the post-flood situation?

4. What specific flood hazard management strategies were proposed? Which ones were rejected and why? Which ones were adopted?

5. Who were the actors involved in the decision-making process? How were they involved?

6. What community, state and federal resources were required to implement the particular strategy? How were these resources obtained?

7. What lessons have been learned by community leaders in the process? What things might they approach differently if they were to start over again?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapters III and V.

NOTES:

4:00 - 5:00 p.m. **THE ROLE OF PUBLIC PARTICIPATIN IN COMMUNITY FLOOD HAZARD DECISION MAKING (PLENARY)**

Purpose:

- To establish the importance of involving various publics in developing a community flood hazard management program.
  - -- Building a constituency for a comprehensive progrm.
  - -- Ensuring equity.
  - -- Building a constituency for implementation.
- To establish some performance standards for effective public participation.
- To expose participants to the range of techniques that are available for public involvement.

Activities:

- Speech
- Diverse Public Perspectives (see Exercise C attached)
- Roundtable Discussion
- Audience Questions and Answers

Review Questions

1. Who are the key actors both within and outside of the community who should be involved in the development of a community flood hazard management program? What range of perspectives are they likely to represent and why is it important to include them?

2. What are some of the key decision points in the development of a flood hazard management program where the public should be involved. What specific kinds of information/input can the various publics provide at each of these decision points?

3. What role can or should the public play during implementation of the flood hazard management program?

4. To what extent in the past has the public been involved in developing a community flood hazard management program? What methods were used? What has been the result of this level of involvement?

5. Does the NFIP have any specific requirements or guidance for public involvement?

6. What are some of the essential elements of an effective community public involvement effort? What are some of the techniques which may be most useful in achieving quality public participation?

7. What are some potential sources of assistance to communities in developing a meaningful public participation effort?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapter VI.

NOTES:

EXERCISE C

INTRODUCTION OF PARTICIPANTS

Participants for the Flood Hazard Institute were chosen to represent a diversity of opinions and backgrounds. The purpose of this segment of the program is to give everyone a better understanding of the attitudes and perspectives shared by fellow attendees, resource people, and Institute staff.

DIRECTIONS FOR EXERCISE: Indicate your opinion on each question by marking the horizontal line with an "x" above the appropriate number. Then indicate how strongly you care about this issue by circling a letter from A (very important issue) to E (unimportant issue) on the vertical line. You will have ten minutes to mark your responses, and then we will sample opinion in the group.

1) How much weight should be given to public opinion in the development of a community flood hazard management program?

------1---------2----------3----------4--------5-----

			A (very important issue)
The decisions involve complex technical issues and should be made by experts	Equal weight should be given to public opinion and expert conclusions.	The important decisions in developing a flood hazard management program are not that technical, and the public, who has to live with the results, should have the primary say.	B C (moderately important) D (unimportant issue)

EXERCISE C (continued)

2) Granted that most people would like to see both environmental improvement and low taxes and economic development, how would you vote in a clear-cut choice between the economy and the environment in your town?

----------1------------2--------3-------4---------5-------

The economic stability of a community is the most important consideration. After all if people don't have jobs and money to spend they won't care about their environment.	Equal weight given to both	Maintaining the community's environmental quality is most important. Poor environmental quality produces all sorts of hidden community costs which too often aren't considered.

A (very important issue)

B

C (moderately important)

D

E (unimportant issue)

3) Should residents who knowingly choose to live in flood hazard areas be assessed some sort of tax to cover the community costs (emergency police, fire, rescue services, public utility repairs, warning and evacuation procedures) incurred as the result of a flood disaster?

------1---------2------------3-------------4------------5---------

No, these are costs rightly borne by the community as a whole. Besides, it would be impossible to establish an equitable tax.	Possibly in situations where the flood hazard is well defined and the resident who has a choice between a non-hazard location chooses the hazardous location because of the personal benefits (aesthetics, convenience) derived from the hazardous location.	Yes, these residents reap the benefits of such a location, so they should also bear the costs.

5:30 - 6:30 p.m. SOCIAL HOUR

6:30 - 7:30 p.m. DINNER

7:30 p.m. RECOMMENDATIONS FOR GROUP ACTION

Purpose:

- To continue the working group identified the first evening and give that group opportunities to develop ideas for follow-up activities after the conference.

Activity:

- Small group sessions

Review Questions

1. What are the major flooding problems in your community? What are the most important first steps to be taken to resolve these problems?
2. What role does your state play in encouraging community flood hazard management? How might the state role be enhanced?
3. Given the flood hazard management opportunities which exist in your community, what are likely to be the most effective strategies available to realize these opportunities?
4. Who are the key people in your community, region, state who should be involved in flood hazard management decision-making? Are they now involved?
5. What kinds of public involvement mechanisms may be utilized to involve members of the various publics in your community in the development of a flood hazard management program?

6. What are the first steps to be taken when you return home to ensure that a public involvement program to develop a flood hazard management program actually materializes?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapters III and VI.

NOTES:

DAY THREE

8:30 - 9:30 a.m. ISSUES IN PUBLIC PARTICIPATION

Purpose:

- To allow participant to focus on the issues and tools that influence the development of a successful public involvement program.

Activities:

- Concurrent small group workshops on public participation issues and tools. These workshops might cover such topics as:

  -- goal setting
  -- Coalition building
  -- Bargaining and negotiation
  -- Communication tools
  -- motivating the public

Review Questions

A. Goal Setting

1. Who in the community should be involved in the setting of goals for a flood hazard management program? How can or should broader community goals be reflected?

2. How do you identify community goals? What techniques (questionnaires, local workshps, referendum) are most useful? How can you ensure that the goals you identify in fact reflect those of the entire community?

3. What do you do in situations when some goals seem to be in direct conflict? What are some effective methods for achieving compromise?

B. Coalition Building

1. How can building a coalition help the passage and implementation of a community flood hazard management program?

2. What interests should comprise your coalition. How may these interests be identified?

3. How does one identify the common interests which may bind a coalition?

4. What kinds of organizational decision-making will help keep a coalition together?

5. What resources, skills and outreach ability do the various interest groups which might comprise a coalition have which might be utilized in developing a comprehensive flood hazard management program?

C. Bargaining and Negotiation

1. When is formal bargaining or negotiation useful?

2. How do you establish those points which are not negotiable? Those that are?

3. How do you identify tradeoffs that various groups may be willing to make to come to agreement?

4. How do you approach an opposing group on the subject of bargaining?

5. When is it useful to have a third party assist in the bargaining process?

6. What type of technical expertise might be required during a negotiation process?

7. If a third party negotiator is used, what skills should he/she have?

D. Communication Skills

1. What are some of the most effective means to reach the general public? (news media, public television) What basic message should be relayed to different publics?

2. How should materials be presented to the general lay audience? How can you translate complicated technical analysis into simple English?

3. How can you be sure your message is being received and clearly understood? What kinds of feedback mechanisms are appropriate?

E. Motivating the Public

1. How do you overcome initial public apathy or unawareness? What techniques could you use to "sell" your program to the public?

2. What are some of the causes of public apathy? How do you overcome them?

3. What are some examples of techniques which have worked in other communities?

4. How do you keep the public involved and interested?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapter VI.

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Appendices.

NOTES:

9:30 - 10:00 a.m. BREAK AND SWITCH

10:00 - 12:00 noon DESIGNING A FLOOD HAZARD MANAGEMENT PROGRAM IN COASTAL COMMUNITIES

Purpose:

- To examine in a realistic setting t
factors tht affect the opportunitie
for flood hazard management in coast
communities.
- To examine the basic regulatory fra
work likely to result from communit
participation in the NFIP, and othe
Federal and State programs.
- To examine the range of strategies
tools that might be linked together
develop a comprehensive flood hazar
management program according to the
appropriate flood hazard management
stage.
- To identify the economic and social
interests that may be affected by al
native strategies.
- To explore the range of public parti
pation techniques which would be use
when selecting and implementing a co
hensive community flood hazard manag
program.
- To establish the tradeoffs that must
made by a community in designing a f
hazard management program.

Activities:

- Participants will divide into six to
groups, each of which will utilize a
hypothetical case example (included
workbook) as a starting point for di
- Each case study contains information
the following factors that affect an
constrain opportunities for flood ha
management.

-- physical characteristics;
-- population;
-- flooding problems;
-- economic and social considerations;
-- political context;
-- additional institutional considerations;

Community maps on present land ues and flood hazard areas are included. Participants will draw on the case study material and their own experiences to address range of questions.

Review Questions:

1. Who are the interests with a stake in flood hazard management?

2. What is the nature of their stake?

3. What needs of various interests will have to be met in order to obtain their support in meeting flood hazard management goals?

    Local government
    Low income
    Business
        Banker
        Real estate developer
        Salesman
        Industry/Land
        Water dependent/Water based industry
    Civic Leader
    Environmentalist

4. What kinds of tradeoffs (economic/social/environmental/political) might various interests be willing to make?

5. What kinds of strategies can be adopted to reflect these tradeoffs and to respond to the flooding problems of this community? In the pre-flood period? In the post-flood period?

6. What are the likely impacts of various strategies on various interest groups? On community as a whole?

References:

Flood Hazard Management and Natural Resource Protection: Community Action Guide, Chapters III, VII, and VIII.

NOTES:

OVERVIEW OF FLOOD HAZARD MANAGEMENT TOOLS

TOOLS	DESCRIPTION/PURPOSE 1/	REGULATORY STANDARDS	LIMITATIONS	COMMENTS
PLANNING/PLANS				
• Land use plans Comprehensive plans Master plans	• Guides to public and private development. • Medium for articulation of community goals • Useful in identifying: sources of data; potential development pressures; areas of critical ecological, cultural, or economic concern.	• A recommended planning consideration under NFIP.	• Generally have no legal force in themselves	• Hazard Mitigation goals need to be coordinated with a community's comprehensive plan. • Plans must be made a functional document in the decision-making process.
• Warning and evacuation (disaster preparedness)	• Outlines specific actions and responses to floods taken to reduce the risks to human life. • Elements include: flood forcasting; advanced warning systems; evacuation plans.	• Under NFIP. • Plans required for mobile home parks (with A Zone). • Recommended planning consideration under NFIP.	• Does not reduce the risks to property or structures. • Warning system must be maintained. • Public bears the cost.	• Plans must be made and support systems in place and tested before the flood event. • Plans are a necessary aspect of any community flood hazard management scheme.
• Predisaster contingency planning	• Guides use of disaster recovery monies and postdisaster reconstruction.	• Meet 406 requirements of Disaster Relief Act of 1974. See chapter V.	• Possible legal implications of designating areas in advance for acquisition.	• Broad policies to guide redevelopment in the postdisaster context need to be considered in a predisaster context. • Plans and policies need to be flexible and integrated into overall community objectives.

OVERVIEW OF FLOOD HAZARD MANAGEMENT TOOLS

TOOLS	DESCRIPTION/PURPOSE 1/	REGULATORY STANDARDS	LIMITATIONS	COMMENTS
REGULATION 2/				
	• Impose conditions on the use made of land controls: - the location - type of use - construction and design • Two approaches - prohibitory - performance standards	(See below)	• Limited application to existing uses. • Constitutional issues.	• Common regulatory approaches including zoning, subdivision, and building codes are supportive of one another.
• Zoning	• Specific use locations (zones) on map • Specifies use requirements	• Delineate floodway areas and prohibit new structural uses and land alterations which will individually or cumulatively increase flood heights or velocities beyond defined levels. • Establish flood protection elevations and protection standards for floodway and flood fringe areas and uses.	• Above and: • May be weakened by variances or exceptions. • Does not incorporate building design standards.	• Zoning traditionally used prohibitory approach, however: • Increased use of performance standard criteria or special premitting is an effective approach to management of sensitive resource areas such as floodplains and erosion prone areas.
• Subdivision	• Regulates the division of large parcels into smaller parcels for development. • Insures that land is for proposed (new) use and that improvements are provided.	• Prevent subdivision of land unsuitable for intended purposes. • Require that each building site have an area above flood elevation suitable for building purposes, onsite waste disposal (where applicable), and adequate access. • Require that flood hazard areas be noted on face of plat and, in some cases, the adoption of deed restrictions to control future uses in flood-prone areas. • Require flood protection for sewer, water, and roads installed by subdivider. • Require installation of drainage facilities or payment of fees in lieu of installation by subdivider. • In some instances, require dedication of flood areas as parks or for other open space purposes by the subdivider.	• Above and: • Only indirectly controls use of land; must be in combination with zoning. • Loopholes common.	

OVERVIEW OF FLOOD HAZARD MANAGEMENT TOOLS

TOOLS	DESCRIPTION/PURPOSE [1]	REGULATORY STANDARDS	LIMITATIONS	COMMENTS
• Transfer Development Rights (TDRs) • Purchase Development Rights (PDRs)	• Form of density transfer allows property owners to sell or transfer their rights to develop their property leaving the property in less intensive use.	N/A	• Requires specific enabling legislation. • New technique has limited application.	• Conservation easements are a similar technique. • Used mostly to protect farmland.
• Building codes	• Specify construction standards and practices including elevations, floodproofing, structural design and materials standards. • Protect health and safety by preventing or controlling surface and groundwater pollution.	• Require elevation of structure and utilities on fill, pilings, or by other means. • Alternatively, require structural floodproofing of buildings and utilities through special design and use of waterproof materials	• Applies to new uses. • Requires detailed flood data. • Must be used with other tools. • Requires careful enforcement.	• Sanitary codes indirectly can control development in flood hazard areas through soil suitability criteria.
• Drainage and erosion control [3] (stormwater management) (land treatment)	• Control the amount of stormwater runoff and prevent soil erosion. • Prevent future increases in flood heights.	• Require onsite detention of storm waters.	• Effectiveness limited to small, frequent floods. • Applies to new construction only.	• Frequently, requirements are integrated into zoning, subdivision, and/or building codes.
• Dredge and fill	• Controls and removal (dredging), depositing of dredged material, and filling of wetland areas.	• See description of section 404, appendix A.	• Frequently applies to designated wetland areas only.	
• Critical areas [4] protection	• Protect critical resource areas such as wetlands, floodplains, coastal zones, scenic river corridors.	• EO 11988, CZMA, Wild Scenic Rivers, etc.	• Requires natural areas inventory. • Requires use of tools (zoning, taxation, etc.) to implement.	• Frequently, performance standards for critical areas are incorporated within zoning and subdivision regulations.
• Facility siting review	• Requires impact review of proposals for large facilities or developments. • Promote avoidance of flood-prone sites.	• (Standards dependent on permit requirements).	• Generally applies only to large facilities of greater-than-local impact	

OVERVIEW OF FLOOD HAZARD MANAGEMENT TOOLS

TOOLS	DESCRIPTION/PURPOSE	REGULATORY STANDARDS	LIMITATIONS	COMMENTS
ACQUISITION/REDEVELOPMENT 5/				
	• Permanently removes structures from hazard area. • Achieves multiple goals (urban waterfront revitalization, hazard mitigation, provision of recreation and open space).	• See discussion: Section 1362, chapter V.	• Costly. • May result in loss of tax revenues.	• There are a variety of acquisition and tax relief strategies: - fee simple - easements - PDR - land banking - tax exemptions - deferred taxation - differential assessments - graduated property tax - taxation for best use - deductions Tax savings may result. See: Baltimore County Case Study, chapter III.
PUBLIC INFORMATION/ EDUCATION				
• Warning and evacuation plans (disaster preparedness)	• See description under Plans.			
• Educational	• Educate citizens to the nature of floods, flood hazards, and strategies to mitigate flood losses.	N/A	N/A	
• Disclosure requirements	• Provide advance notice (disclosure) of flood hazard to prospective land buyers.	• Interstate Land Sales Full Disclosure Act of 1968 (Federal)	• Generally applicable only to land transfers. • Often applies only to large acreage sales (50 acres and above).	• Increasingly states are adopting Disclosure Laws which apply to all land transfers.

OVERVIEW OF FLOOD HAZARD MANAGEMENT TOOLS

TOOLS	DESCRIPTION/PURPOSE	REGULATORY STANDARDS	LIMITATIONS	COMMENTS
ECONOMICS				
• NFIP	• Provides subsidized flood insurance. • Encourages adoption of floodplain management ordinances.	• (See detailed description in Chapter IV.)		
• Taxation	• Provides incentives and/or disincentives for certain land uses.	N/A	• Difficult to administer, may remove or reduce tax revenues.	• Three basic types: - preferential assessments - deferred tax laws - restrictive agreements • Special tax assessment to cover the costs of warning and evacuation have been suggested.
• Public finance policy	• (Capital budgeting process) effectively determines many land use decisions and development patterns • Can discourage development in high risk zones.	N/A	• Applies only to new, improved, or damaged services. • Local residents may not have control of federal allocations.	• Budgeting process must be linked to overall community development plans.

OVERVIEW OF FLOOD HAZARD MANAGEMENT TOOLS

1/ For description of the Administrative aspects of each tool see chapter VIII, appendix A.

2/ Portions adapted from J.A. Kusler, A Perspective on Floodplain Regulation for Floodplain Management, EP 1165-2-304, Washington, D.C., U.S. Army Corps of Engineers, June 1976.

3/ See Residential Stormwater Management, Urban Law Institute, American Society of Civil Engineers, National Association of Home Builders, 1975.

4/ See Guidebook for State and Local Governments: Critical Areas Program, July 1977 (The Institute of Rational Design, N.Y.)

5/ See Protecting Nature's Estate, Techniques for Saving Land, U.S. Department of Interior and The Nature Conservancy, December 1975.

Kusler, Jon, Floodplain Acquisition, Washington, D.C.: Water Resources Council, December 1979.

N/A - not applicable

Exercise D

Use this chart to record the flood hazard management opportunities identified in the workshop discussion of the case example.

Potential Opportunities for Flood Hazard Management

	Pre-Flood Situation	Post-Flood Situation
Within 100-Year Floodplain Structures (Existing and Future) Undeveloped Land		
Outside Floodplain but within community		
Outside Community but within watershed		

Exercise E

Use this chart to record the results of the workshop discussion relating to possible strategies identified in the case example. Refer to chart in selecting the most appropriate strategies.

	Flood stage where most applicable			Affected Interests	Trade-offs
	Pre-Flood	During Flood	Post-Flood		
Strategy (tool)					

HAMPTON COUNTY/CITY OF OAKTON *

Hampton is a coastal county located on a peninsula between the Atlantic Ocean and the Coral River (see attached maps). Oakton, which is located in the center of the county, is the largest city and county seat. Although the county contains other small towns, they will not be discussed in any detail in this case example.

I. Physical Characteristics

Hampton County

Located in the lower part of the coastal plain physiographic province, the topography of the county is typified by sandy ridges, sandy loam plateaus, and swampy areas of Carolina bays. Land elevations vary from sea level upward to 75 feet. Streambeds are gently sloping, with the lower reaches of most streams being under the influence of lunar tides.

The 27 miles of oceanfront is comprised of a narrow band of barrier islands and beaches, most of which are backed by the intercoastal waterway. A large portion (2/3) of these islands and beaches is currently developed at low or medium densities with seasonal and year-round homes. However, a major section of low-lying islands (Wilton Island) comprised primarily of low salt marsh is as yet undeveloped.

Approximately 19% of the county's total land area is developed for urban or industrial uses; the remaining area is comprised of agriculture and forestry, water and wetlands, and vacant land. The majority of the county is unincorporated.

The climate in the county ranges from hot and humid in the summer to cool in the winter. Rain occurs throughout the year but is heaviest in the summer and early fall.

Oakton

Oakton encompasses approximately 22 square miles and lies along the east bank of Coaral River, 26 miles upstream from its mouth and 8 miles from the Atlantic Ocean. It is the county seat and a major port along the Atlantic coast.

Numerous creeks transect the city, the most significant being Scott Creek which meanders through the northern portion of town, and James Creek running from southeast to northwest emtying into Scott Creek. Barney Creek transects the southwest portion of the town eventually emptying into Coral River. Much of the floodplain along the Scott Creek and Barney Creek is classified as riverine wooded swamp and contains a significant amount of primary and secondary wetlands. Along the Coral River, the floodplains consist primarily of brackish marsh typical of a tidal river system.

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* The case study community resembles an actual community in some respects. Facts have been changed, however, to make the case study more useful in the Institutes. The study community should accordingly be considered fictitious.

Much of the city lies above the 100-year flood elevation on a bluff rising above Coral River. But some significant development does exist in the lowlands adjacent to the river and its tributaries, particularly Scott Creek, James Creek and Barney Creek. This development includes park facilities, warves, warehouses, storage tanks, commercial establishments and residences.

Little developable land remains in the area surrounding the central business district. Consequently, in recent years the areas around Barney and Scott Creeks have become increasingly attractive for development.

II. Population

The county population in 1970 was 80,000, with over 50 percent living in Oakton. Although Oakton's population increased only slightly since then, the county's population grew steadily at the rate of 2-3% per year. During the summer, tourists flock to the county's relatively unspoiled beaches, tremendously increasing the population of the coastal areas. Many summer residents are now converting beach homes to year round residences. This trend could represent a serious problem, given the low level of existing public services presently provided by the county in this area.

Because of the county's extensive and attractive coast and its solid industrial base, growth pressures are expected to continue. Many residents are beginning to express concerns about threats to their quiet rural lifestyle, environmental damage, and rising taxes resulting from unsound development.

III. Principal Flooding Problems

Hampton

Storm tides generated in the Atlantic Ocean by hurricanes and other severe wind storms are the dominant source of flooding in Hampton Couty. During extreme tides most of the barrier beach islands are overtopped to such a depth that ocean waves pass directly into the sounds, impinging on the mainland shores and entering the estuaries of the coastal streams. Heavy storms can also generate tides which move up the Coral River and into its tributaries.

Observed high water marks and tide gauge records show that ocean tides higher than 5 feet have occurred six times since 1954. The last major hurricane in 1952 destroyed over 600 oceanfront homes and damaged another 300. Most of the homes have been replaced and many new ones have been built since then. Conseqently, observers expected that damages from the next hurricane will be quite costly.

In addition to flooding from storm tides, extreme rainfalls can generate flooding in the county's numerous smaller rivers and streams. However, due to the estuarine nature of the Coral and North Coral Rivers, flood flows from these upstream tributaries have a negligible effect on river stages in Hampton County.

Currently there are no flood protection projects within the unincorporated portion of the county. Along the coast, numerous beach nourishment projects are underway in an effort to counter the natural erosive effects which have been aggravated by construction of artificial inlets.

Oakton

Storm tides are also the dominant flood source in Oakton. Generated in the Atlantic Ocean by hurricanes and other severe windstorms, these tides move up the Coral River and into its tributaries. The highest tide of record occurred during Hurricane Hazel when the Coral River reached approximately 7 feet at the foot of Cook Street. (Cook Street runs parallel and just north of Route 40.) Storm surges also caused flooding along Barney Creek and Scott Creek and lower portions of James Creek.

During extreme rainfalls, most of the creeks in Oakton are also subject to flooding from stream overflow. A severe thunderstorm in 1969 produced $500,000 worth of damages. Coral River, however, due to its estuarine nature is negligibly effected by upstream flows.

Local drainage and flood control projects involving stream channelization have been constructed along portions of James Creek, otherwise there are no flood control projects in the city. If development within the 100-year floodplain continues at its current rate, flood damages resulting from the next major hurricane can be expected to exceed $2 million.

IV. Economic/Social Considerations

Hampton

The population of the county is growing rapidly, many of the new residents attracted by water-related amenities which the county has to offer. Lands located adjacent to water have become the most attractive for residential development. Along the coast, development on the barrier islands and inland waterway has increased rapidly over the last 25 years. A sizeable portion of these areas still remains relatively undeveloped, but pressure to construct residential/recreational homes is strong. Inland, most of the new residential development is again occurring adjacent to shorelines.

Industrial development, particularly in the area around Oakton has increased tremendously in recent years and is partly responsible for the county's rapid growth. Tourism and second home development along the coast are other factors contributing significantly to the county's economic base.

The county has recently completed a land use analysis which identifies areas suitable for development. Suitability is based on a number of environmental factors, such as septic tank suitability, load supporting capability of soils, and unique values such as prime agricultural lands, wetlands, floodplain water recharge areas, etc. According to this analysis, over one half of the county is not suitable for any development whereas the rest should be developed with caution.

Oakton

The major portion of Oakton is already developed. Most of those areas still available and attractive for future development lie within the 100-year floodplain of the Coral River and James Creek. However, in recent years the city has not experienced significant growth pressures as the majority of new development within the county has occurred outside the city boundaries in the rural areas.

Existing development within the 100-year floodplain of the Coral River consists primarily of industrial and commercial activities including railroad terminals, factories, warehouses, etc., some of which must essentially be located adjacent to the river. Some residential development also exists along Coral River north of the industrial zone. Development within the 100-year flood boundaries of Scott Creek, James Creek is almost entirely residential, much of it low income, mobile home development. Development along Barney Creek is primarily middle to high income residential.

Flood damages resulting from Hurricane Hazel totaled over $1 million and city officials have estimated that due to increases in property value and new development within the flood hazard area, the next major hurricane could result in damages two to three times that figure. Seven people died during that hurricane and over 1,500 families were left homeless. Flooding resulting from heavy rains has periodically resulted in substantial damages exceeding $500,000 much of which is damage to public property such as roads, bridges and sewer and water lines. Experts project that a very heavy rain could produce close to $1 million in damages to property along James Creek and other tributaries.

V. Political Context

Hampton

Hampton County is governed by a Board of Commissioners elected at large. The commissioners are generally sensitive to the need for a strong flood hazard management program in the county and are supportive of the state's coastal zone management efforts. The commissioners also recognize the importance of working closely with the incorporated areas of the county, particularly the city of Oakton, in developing a comprehensive plan.

Some board members, however, are equally convinced of the need to promote continued economic development within the county and recognize the high economic value of shorefront properties. They are reluctant to impose what they might consider overly restrictive land use controls.

The County has adopted standard zoning and subdivision regulations. These have recently been amended to incorporate the minimum requirements of the NFIP regular program, including for coastal areas: delineation of the high velocity zone; elevation (on pilings) of new structures within the high hazard area to the 100-year flood level (which reflects storm surges but not wave height); minimum construction standards; and limitations on man-made alterations to sand dunes and mangrove swamps. Similar requirements also apply to inland flood hazard areas. Although the county did consider additional land use control measures such as mandatory set back requirements and prohibition of development on wetlands, officials voted these down as being too prohibitive.

Oakton

Oakton has a mayor-city county form of government. The mayor is elected by the voters and has considerable influence and power over actions of the city council.

The present mayor has been in office for eight years, during which the city has not experienced any serious flooding. He does not consider flooding to be a significant problem and does not support the enforcement of stronger flood hazard management regulations.

Oakton entered the regular phase of the NFIP program in 1977 having developed an acceptable floodplain management program. This program consists of ordinances incorporated into their existing standard zoning regulations which essentially prohibit any new development in the floodway and require elevation of any new buildings within the 100-year floodplain to the 100-year flood level. To date, no attempt has been made to further restrict development within the 100-year floodplain or to acquire additional portions of the hazard area for recreation/open space or other purposes. (A one-mile stretch of James Creek is presently designated for recreation as is a portion of the southern shore of Barney Creek.)

Local officials have encountered very little resistance to implementing the ordinances, since they do not appear to impose an unreasonable burden on most property owners. However, officials believe there would be strong public resistance to stronger ordinances which precluded development within the 100-year floodplain or involved any sort of acquisition/relocation program. Residents in the Barney Creek area, which is one of the more exclusive sections of town, are particulary resistant to any actions which might be initiated by local officials to restrict future use of their property.

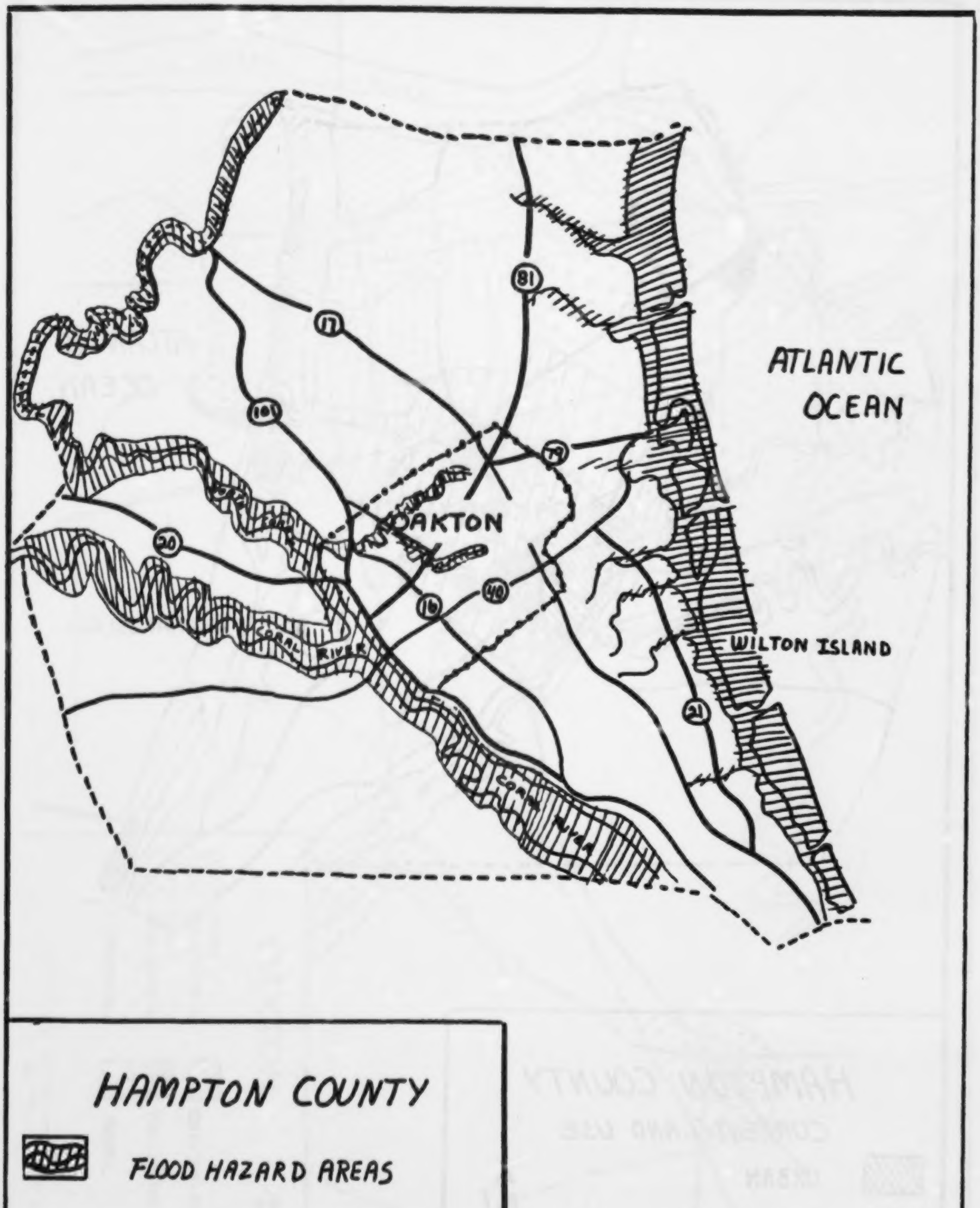
VI. Additional Institutional Considerations

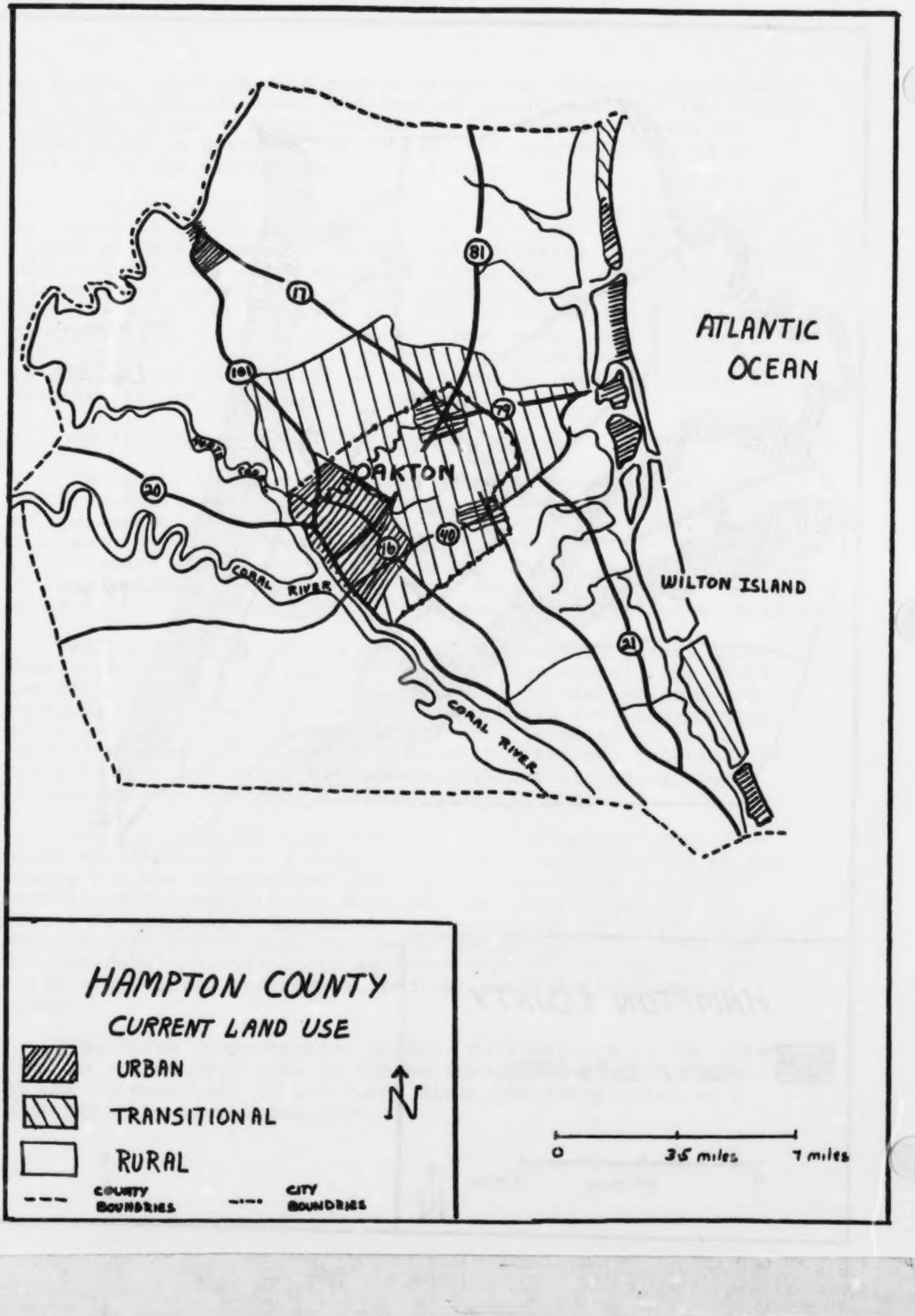
The State has enacted a Coastal Zone Management program which establishes specific state policies concerning prevention of unreasonable risk in hazard areas, minimizing future flood damages, encouraging establishment of parks and open space and flood hazard areas, and protecting natural and protective values of the shoreline. The state program requires that local governments by the state to develop plans and implementation strategies.

All dredge and fill activities in navigable waters must receive a permit from the Army Corps of Engineers. The State has direct permitting authority over all coastal wetland and waterway activities and reviews all proposed development projects in these areas to ensure that the integrity of these natural resources will not be adversely affected, and that the projects are consistent with state policies including those of coastal zone management, water quality, etc.

The areawide 208 plan prepared for the county identifies storm water runoff as a major source of water pollution in the county and has recommended that local governments implement non-structural measures to mitigate the adverse impacts of future development. Suggested implementation measures include requirements for on site stormwater retention facilities for all new developments, local sediment control ordinances, and local acquisition programs to protect natural flood storage areas.

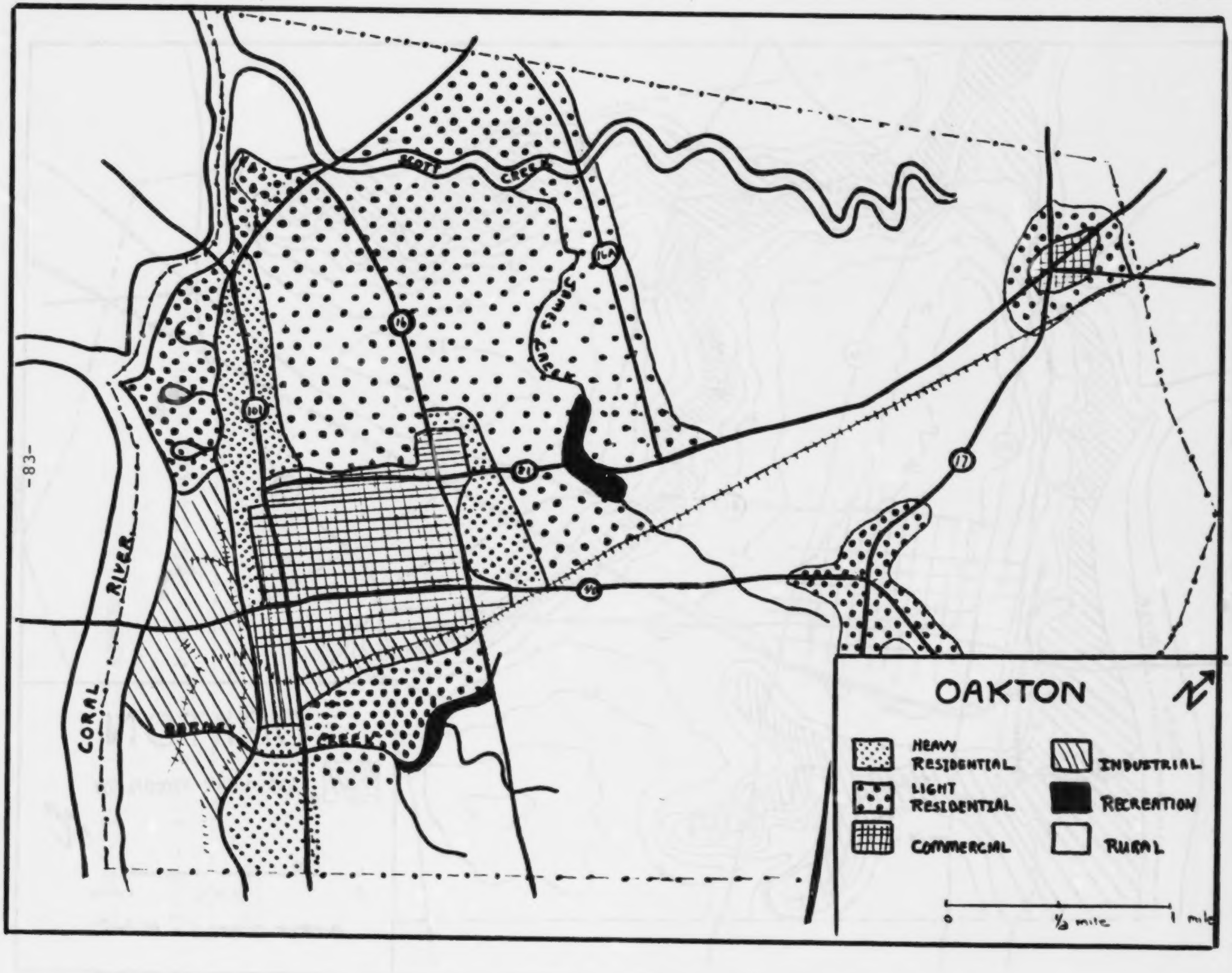
The State Comprehensive Outdoor Recreation Plan has identified an undeveloped area in the northwest corner of the town at the intersection of the Coral River and Scott Creek as a high priority recreation site.

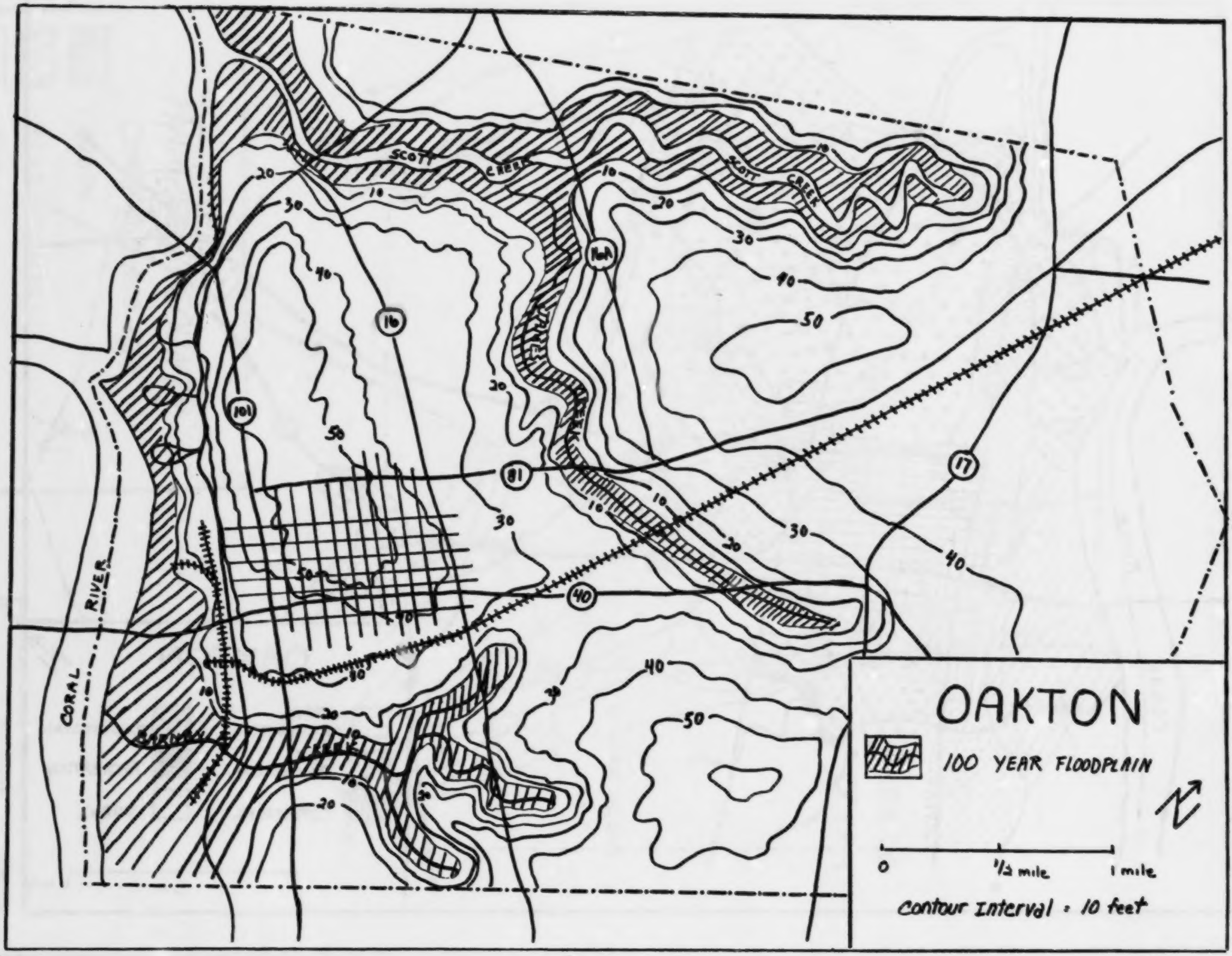

ATLANTIC OCEAN
81
17
101
79
OAKTON
20
16
40
CORAL RIVER
WILTON ISLAND
21
CORAL RIVER
HAMPTON COUNTY
FLOOD HAZARD AREAS
0
3.5 miles
7 miles
N



HAMPTON COUNTY
CURRENT LAND USE

ATLANTIC OCEAN
OAKTON
WILTON ISLAND
CORAL RIVER
CORAL RIVER
81
17
101
79
20
40
16
21
▨ URBAN
▧ TRANSITIONAL
☐ RURAL
--- COUNTY BOUNDRIES
-·-· CITY BOUNDRIES
N
0
3.5 miles
7 miles


OAKTON
HEAVY RESIDENTIAL
LIGHT RESIDENTIAL
COMMERCIAL
INDUSTRIAL
RECREATION
RURAL
0
½ mile
1 mile
CORAL RIVER
SCOTT CREEK
JAMES CREEK
BARNEY CREEK
101
16
16A
12
46
17


OAKTON
100 YEAR FLOODPLAIN
0
1/2 mile
1 mile
Contour Interval = 10 feet
SCOTT CREEK
SCOTT CREEK
JAMES CREEK
BARNEY CREEK
CORAL RIVER
101
16
16A
81
40
17
10
20
30
40
50

12:30 - 1:30 p.m. LUNCH

2:30 - 3:30 p.m. FINAL SMALL GROUP DISCUSSIONS

NOTES:

3:30 - 4:30 p.m. CONCLUSION--COMMUNITY FLOOD HAZARD MANAGEMENT: A CHALLENGE TO WORK TOGETHER

Purpose:

- To give participants an opportunity to exchange information on planned follow-up activities.
- To help participants achieve a sense of what was accomplished by the program.
- To relate planned follow-up activities back to goals identified early in the conference.

Activity:

- Series of short reports by small group leaders;
- Newsprint listing accomplishments of small groups posted around room;
- Discussion of goals and accomplishments led by group facilitator.

NOTES:

GLOSSARY

ACTUARIAL RATES[1] - Insurance rates determined on the basis of a statistical calculation of the probability that a certain event will occur. Actuarial rates are also called "risk premium rates." They are established by FIA pursuant to individual community flood insurance studies and investigations that are undertaken to provide flood insurance in accordance with the National Flood Insurance Act and with accepted actuarial principles, including provisions for operating costs and allowances.

AREA OF SPECIAL FLOOD HAZARD [1] - The land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year.

BARRIER ISLANDS [5] - Elongate seafront islands of sand formed by wave action.

BASE FLOOD (REGULATORY FLOOD) - The selected flood frequency for regulatory purposes. The NFIP has adopted the 100-year flood as the base flood to indicate the minimum level of flooding to be used by a community in its floodplain management regulations.

BERM - The horizontal portion of the backshore beach formed by sediments deposited by waves.

BOG [6] - A wetland usually developing in a depression or lake with poor drainage.

BOTTOMLAND HARDWOODS - Tree species that occur on water-saturated or regularly inundated soils. Classified as wetlands, these areas content both trees and woody shrubs.

BULKHEAD [5] - A vertical wall of wood, steel, or concrete, built parallel to the shoreline and designed to deflect waves and control erosion.

CHIEF EXECUTIVE OFFICER (CEO) [1] - The official of the community who is charged with the authority to implement and administer laws, ordinances, and regulations for that community.

COASTAL HIGH HAZARD AREA (CHHA) [1] - "Coastal high hazard area" means the area subject to high velocity waters, including, but not limited to, hurricane wave wash or tsunamis. The area is designated on a FIRM as Zone V1-30.

COMMUNITY [1] - Any State or area or political subdivision thereof, or any Indian tribe or authorized tribal organization, which has authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction.

EMERGENCY PROGRAM [1] - The program as implemented on an emergency basis in accordance with NFIP. It is an interim program to provide a first layer of subsidized insurance before the detailed risk studies from which actuarial rates are computed have been completed.

ENCROACHMENT [4] - Any fill, structure, building, use, accessory use, or development in the floodway.

ENCROACHMENT/FLOODWAY LINES [4] - The limits of obstruction to flood flows. These lines are on both sides of and generally parallel to the river or stream. The lines are established by assuming that the area landward (outside) of the lines will ultimately be developed in such a way that it will not be available to convey flood flows.

EROSION [1] - The process of the gradual wearing away of land masses.

ESTUARY [5] - A confined coastal water body with an open connection to the sea and a measurable quantity of salt in its waters.

FIRST LAYER COVERAGE [1] - The maximum amount of structural and contents insurance coverage available under the NFIP Emergency Program.

FLOOD [1]/FLOODING [1] - A general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland and/or tidal waters, and/or unusual and rapid accumulation of runoff of surface waters from any source.

FLOOD CONTROL WORKS - See FLOOD PROTECTION SYSTEMS.

FLOOD DISCHARGE [3] - The total quantity of water flowing in a stream and adjoining overflow areas during times of flood. It is measured by the amount of water passing a point along a stream within a specified period of time and is usually measured in cubic feet of water per second (cfs).

FLOOD FREQUENCY [3] - The frequency with which a flood of a given discharge has the probability of recurring. For example, a 100-year frequency flood refers to a flood discharge of a magnitude likely to occur on the average of once every 100 years or, more properly, has a 1 percent chance of being exceeded in any year. Although calculation of possible recurrence is often based upon historical records, there is no guarantee that a 100-year flood will occur at all within the 100-year period or that it will not recur several times.

FLOOD HAZARD [2] - The potential for inundation and involves the risk of life, health, property, and natural floodplain values.

FLOOD HAZARD BOUNDARY MAP (FHBM) [1] - An official map of a community, issued through the NFIP, where the boundaries of the flood, mudslide (i.e., mudflow) and related erosion areas having special hazards have been designated as Zone A, M, and/or E.

FLOOD HAZARD MANAGEMENT - Encompasses all local, State, and Federal activities taken before, during, and after a flood to reduce flood losses or in response to a flood disaster.

FLOOD INSURANCE [1] - The insurance coverage provided under the National Flood Insurance Program.

FLOOD INSURANCE STUDY (FIS) (FLOOD ELEVATION STUDY) [1] - An examination, evaluation, and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation, and determination of mudslide (i.e., mudflow) and/or flood-related erosion hazards.

FLOOD INSURANCE RATE MAP (FIRM) [1] - An official map of a community on which the FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community.

FLOOD PROTECTION SYSTEMS (STRUCTURAL CONTROLS) [1] - Those physical structural works for which funds have been authorized, appropriated, and expended and which have been constructed specifically to modify flooding to reduce the extent of the area within a community subject to a "special flood hazard" and the extent of the depths of associated flooding. Such a system typically includes hurricane tidal barriers, dams, reservoirs, levees, or dikes. These specialized flood modifying works are those constructed in conformance with sound engineering standards.

FLOOD-RELATED EROSION [1] - The collapse or subsidence of land along the shore of a lake or other body of water as a result of undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as a flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding.

FLOODPLAIN/FLOOD-PRONE AREA - Any land area susceptible to being inundated by water from any source (see the definition of "flooding").

FLOODPLAIN MANAGEMENT [1] - The operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works, and floodplain management regulations.

FLOODPLAIN MANAGEMENT REGULATIONS [1] - Zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (covering, for example, floodplains, grading, and erosion control) and other applications of police power. The term describes such State or local regulations, in any combination thereof, which provide standards for the purpose of flood damage prevention and reduction.

FLOODPLAIN PRESERVATION [2] - The prevention of modification of the natural floodplain environment or maintenance of the floodplain environment in a condition as close as possible to its natural state using all practicable means.

FLOODPLAIN RESTORATION [2] - The re-establishment of a setting or environment in which the natural functions of the floodplain can again operate.

FLOODPLAIN VALUES [2] - Those natural and beneficial attributes associated with the relatively undisturbed state of the floodplain, including values primarily associated with water, living, and cultural resources.

FLOOD PROOFING [1] - Any combination of structural and nonstructural additions, changes, or adjustments to structures that reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

FLOODWAY - That portion of the floodplain consisting of the stream channel and overbank areas needed to carry and discharge flood flows. The floodway is intended to carry the deep and fast moving water.

FREEBOARD - A factor of safety usually expressed in feet above a flood level for purposes of floodplain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.

GROIN - A dam for sand. A groin is a structure built at right angles to a beach to interrupt longshore sand movement and trap sand in order to stabilize or widen the beach.

100-YEAR FLOODPLAIN - The land area adjoining a river, stream, lake, or ocean which is inundated by the 100-year flood. The 100-year flood is the regulatory (base) flood under the NFIP.

HYDRAULICS - The science dealing with the mechanical properties of liquids which describes the specific pattern and rate of water movement in the environment.

HYDROLOGY - The science of the earth's waters which describes the occurrence, circulation, distribution, chemical, and physical properties of water and its reaction with the environment.

LITTORAL [5] - Of or pertaining to the shore, especially of the sea; coastal.

LITTORAL DRIFT [5] - The movement of sand by littoral (longshore) currents in a direction parallel to the beach along the shore.

MARSH [6] - A wetland dominated by herbaceous or nonwoody plants, often developing in shallow ponds or depressions, river margins, tidal areas, and estuaries.

MANGROVE SWAMP (STAND) [5] - An assemblage of subtropical trees of the genus Rhezaphora forming dense thickets which extend into coastal waters.

NONSTRUCTURAL [2] - Any action taken to reduce or prevent flood losses in a floodplain other than the construction of storage dams, retention dams, diversions, channel improvements, and levees. All those adjustments in floodplain occupancy not specifically intended to modify flood behavior. Such adjustments include such devices as public acquisition of land, relocation of facilities, flood proofing, warning systems, and land use regulation.

PRACTICABLE [2] - Capable of being done within existing constraints. The test of what is pracicable depends upon the situation and includes consideration of the pertinent factors, such as environment, cost, or technology.

PRESERVE [2] - To prevent modification to the natural floodplain environment or to maintain it as closely as possible to its natural state.

REGULAR PROGRAM - The program authorized by the NFIP under which risk premium rates are required for the first part of available coverage (also known as "first layer" coverage) for all new construction and substantial improvements started on or after the effective date of the FIRM, or after December 31, 1974 for FIRM's effective on or before that data. All buildings, the construction of which started before the effective date of the FIRM, or before January 1, 1975 for FIRM's effective before that date, are eligible for first layer coverage at either subsidized rates or risk premium rates, whichever are lower. Regardless of date of construction, risk premium rates are always required for the second layer coverage and such coverage is offered only after FEMA has completed the Flood Insurance Study for the community.

REGULATORY FLOODPLAIN [3] - The area adjoining a river, stream, lake or ocean which is inundated by a regulatory flood. In riverine areas, the floodplain usually consists of a regulatory floodway and regulatory flood fringe (also referred to as a floodway fringe). In coastal areas, the floodplain may consist of a single regulatory floodplain area or a regulatory high-hazard area and a regulatory low-hazard area.

REGULATORY FLOODWAY [3] - A portion of the area a selected flood would occupy consisting of a stream channel and overbank areas calculated to be capable of conveying the selected flood discharge without flood heights or velocities increasing to exceed stated levels. The regulatory floodway is not an actual channel or cement conduit (as the term "floodway" is sometimes understood by engineers). Rather, it is an area (with or without alterations by man) calculated to be of sufficient width and having sufficient flood conveyance characteristics to pass the flood waters from upstream to downstream points without increasing flood heights more than a half foot, 1 foot, etc., or without substantially increasing velocities over what they would have been without assumed confinement. In this calculation, all areas outside of the floodway are assumed to play no role in passing flood flows, and the floodway itself is assumed to remain in an open condition. Floodway areas are subject to frequent high velocity flooding, often at considerable depths.

(REGULATORY) FLOOD FRINGE (also called the floodway fringe) - The portion of the regulatory floodplain beyond the limits of the regulatory floodway. It is subject to less frequent and lower velocity flooding and does not play a major role in passing flood flows.

RESTORE [2] - To re-establish a setting or environment in which the natural functions of the floodplain can again operate.

REVETMENT [5] - Armors the slope face of a dune or bluff with one or more layers of rock (riprap) or concrete.

RIFFLES - Stream channel bottoms are not uniform. They change in repeating patterns between shallow parts called riffles and deeper pools.

RIPRAP - Rock walls.

RISK PREMIUM RATES - See ACTUARIAL RATES.

SEAWALL [5] - A solid barricade built at the water's edge to protect the shore and to prevent inland flooding.

SECOND LAYER COVERAGE - An additional amount of insurance coverage made available when a community officially enters the Regular Program of the NFIP.

SEDIMENT LOAD - The amount of suspended sediment carried by the stream. The stream's sediment load varies with water velocity and sediment size.

SNAGGING - Removal of submerged or partially submerged tree stumps or branches.

STILL WATER STORM HEIGHT - The projected height or elevation of flood waters generated by coastal storms of various magnitudes calculated under ideal still water conditions where no wind generated waves or storm surges are present.

STATE COORDINATING AGENCY [1] - The agency of a State government or other office designated by a State governor or by State statute at the request of the NFIP Administrator to assist in the implementation of the National Flood Insurance Program in that State.

STRUCTURE [1] - For floodplain management purposes; a structure is a walled and roofed building, including mobile homes, and a gas or liquid storage tank that is principally above ground. "Structure" for insurance coverage purposes means a walled and roofed building, other than a gas or liquid storage tank, that is principally above ground and affixed to a permanent site, including mobile homes on foundations. For the latter purpose, the term includes buildings under construction, alteration, or repair, but does not include building materials or supplies intended for use in such construction, alteration, or repair, unless such materials or supplies are within an enclosed building on the premises.

STRUCTURAL - See FLOOD CONTROL WORKS

SUBSIDIZED RATES [1] - The rates established by the NFIP Administrator involving in the aggregate a subsidization by the Federal Government.

SUBSTANTIAL IMPROVEMENT [1] - Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either, (a) before the improvement or repair is started, or (b) if the structure has been damaged, and is being restored, before the damage occurred. For the purposes of this definition, "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. The term does not, however, include either (1) any project for improving a structure to comply with existing State or local health, sanitary, or safety code specifications that are solely necessary to assure safe living conditions or (2) any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.

SWALE [5] - A low-lying area frequently moist or marshy; an intermittent drainageway; a slough.

SWAMPS [6] - A wetland dominated by woody plants, shrubs, and trees such as maples, gums, and cyprus.

TSUNAMI [5] - A great sea wave produced by submarine earth movement or volcanic eruption.

VARIANCE [1] - A grant of relief by a community from the terms of a floodplain management regulation.

WATER SURFACE ELEVATION [1] - The projected heights in relation to Mean Sea Level reached by floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

WATERSHED [4] - A region or area contributing untimately to the water supply of a particular watercourse or water body.

WETLANDS [2] - Those areas that an inundated by surface or ground water with a frequency sufficient to support and, under normal circumstances, does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include bottomland hardwoods, swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

COMMON ABBREVIATIONS

DR&R - Office of Disaster Response and Recovery of FEMA

FEMA - Federal Emergency Management Agency

FHBM - Flood Hazard Boundary Map

FIA - Federal Insurance Administration of FEMA

FIS - Flood Insurance Study

FIRM - Flood Insurance Rate Map

NFIP - National Flood Insurance Program

REFERENCES

1. As defined in the regulations for the National Flood Insurance Program, 41 FR 46962, 1976.
2. A defined in the U.S. Water Resources Council guidelines for implementing Executive Order No. 11988, 43 FR 6030 (1978).
3. From J. Kusler and T. Lee, "Regulations for Flood Plains," American Society of Planning Officials, Planning Advisory Service Report No. 277 (1972).
4. From Wisconsin Administrative Code, Chapter NR 16 (July 1977).
5. From John Clark, Coastal Ecosystems Management: A Technical Manual for the Conservation of Coastal Zone Resources (New York: John Wiley and Sons Interscience, 1977).
6. As defined in Elinor Lander Horwitz, Our Nation's Wetlands (Washington, D.C.: Government Printing Office, 1978).

APPENDIX I

FLOOD HAZARD MANAGEMENT AND NATURAL RESOURCE PROTECTION

Community Action Guide Summary

FLOOD HAZARD MANAGEMENT AND NATURAL RESOURCE PROTECTION

Community Action Guide Summary

This training document was prepared by the Conservation Foundation under contract to the Federal Emergency Management Agency (FEMA). Any opinions, findings, and conclusions or recommendations expressed in this document are those of the authors and do not necessarily reflect the views of the Federal Emergency Management Agency.

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PREFACE

In September 1979, The Conservation Foundation began work
a contract with the Federal Emergency Management Agency (FEMA)
develop a community training program on flood hazard mitiga-
on. * Our charge was threefold:

- To enhance community understanding of the minimum standards and basic requirements of the National Flood Insurance Program (NFIP), particularly the second phase also known as the regular NFIP program.
- To help local community leaders understand the manner in which the protection of ecosystem functions may be integrated into a hazard mitigation program;
- To assist leaders in communities that have entered or are about to enter the regular phase of the NFIP in providing informed leadership for implementable floodplain management programs.

Under contract with FEMA, The Conservation Foundation
ducted two pilot training institutes for governmental and
governmental leaders from flood-prone communities. Our
k was to also write and produce a volume on community
od hazard management and natural resource protection, a
de show on the same subject, and a trainers' manual on
to present comparable training institutes in other
munities.

The material that follows is a summary of the volume
community flood hazard management and natural resource
tection.** Developed for pre-institute reading, this summary
designed to serve two functions: first to ensure that
ticipants in the training programs arrive at the training
titute with a common understanding of some of the basic
ms and concepts of community flood hazard management;
ond, to start participant examination of the manner in
ch they might involve others in their community in the
elopment of a flood hazard management program.

Mitigation has been defined by the National Governors' Association as "including any activities that actually eliminate or reduce the probability of occurrence of a disaster . . . ".

The volume itself, entitled Flood Hazard Management and Natural Resource Protection: Community Action Guide, is available from FEMA.

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I. FLOODS: NATURAL EVENTS WITH MAN-MADE REPERCUSSIONS

THE NATURE OF FLOODING AND FLOODPLAINS

FLOODS, FLOODING, AND FLOODPLAINS

Floods, the temporary inundation of normally dry land, are the result of a complex set of hydrologic* and hydraulic* interactions.

In a riverine system, flooding occurs when conditions cause a stream channel to be filled with a greater volume of water than it can carry. The excess water rises up and flows over the channel banks onto the adjacent land. In a coastal system, flooding occurs when storm-driven waves rise above the mean high tide level and surge inland to inundate adjacent low-lying lands.

Delineating these flood-prone lands and estimating the probability and frequency of inundation is an art which draws on both hydrologic and hydraulic principles (see Chapter IV).

BENEFITS OF FLOODS AND FLOODPLAINS

Although the inundation of land areas may be hazardous to man, flooding has many beneficial components. Floods play a vital role in the development and maintenance of floodplains and their associated wildlife habitats. Generally, floods are an important source of nutrients and energy for floodplain's habitats. Flood waters are also responsible for the rich, flat alluvial soils that are so valuable for agricultural purposes. Floodplains provide easy access to the water for economic and recreational purposes and serve to lessen the potential destructiveness of floods. Floodplains contribute to the:

- Moderation of flood levels;

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* Hydrology, the science of the earth's waters, describes the occurrence, circulation, distribution, chemical, and physical properties of water and its reaction with the environment. Meteorologic conditions, soil type, vegetative cover, and land use, which can affect the quantity and distribution of water, are hydrologic factors. Hydraulics, the science dealing with the mechanical properties of liquids describes the specific pattern and rate of water movement in the environment. Stream channel shape and roughness which affect the pattern and rate of water movement are hydraulic factors.

- Retention and storage of flood waters;
- Maintenance of water quality; and
- Protection against erosion.

THE NATURE OF FLOOD HAZARDS AND FLOOD DAMAGE

Despite the beneficial aspects of floods and floodplains, with few exceptions floods have been viewed as destructive events, threats to human life and property and to a community's economic vitality. A frequent response to the flood threat was to fight the river or hold back the sea by building levees, flood walls, dikes, and breakwaters. Experience has shown these responses to have only temporary and partial effect. We are beginning to realize that human uses of the floodplain adversely affect the flooding potential of a riverine or coastal water system.

THE MAGNITUDE OF THE FLOOD HAZARD PROBLEM

Riverine and coastal floodplains constitute only about 7 percent of the total land area of the U.S., yet flooding is the most widespread geophysical hazard. The federal government recognizes over 20,000 communities as being floodprone. Estimates are that approximately one-half of U.S. communities suffer significant flooding from riverine and stream overflows alone. Floodplains are estimated to contain 6.4 million dwelling units and considerable non-residential development. Flood losses have increased steadily since the 1930s. In 1966, a federal task force on flood control policy estimated annual losses at $1 billion. The Water Resources Council's latest estimate placed annual losses at approximately $3.8 billion in 1979 dollars. If present trends continue, WRC projects 1985 annual flood losses (in 1979 dollars) of $5 billion. These ever-increasing flood-related damage estimates have spurred a re-evaluation of traditional flood management approaches in this country.

THE MANAGEMENT OF FLOODS IN THE UNITED STATES

HISTORICAL RESPONSES TO FLOOD HAZARDS (PRE-1968)

The history of flood and flood hazard management is one of increasing governmental involvement. During the late eighteenth century and early nineteenth century, flooding was viewed as a regional or local problem. Consequently, attempts to deal with the problem were usually local in nature and scale. The period from 1824 to 1936 saw an increasing amount of Federal activity dealing with flood protection on navigable rivers. The passage of the Flood Control Act of 1936 marked the beginnings of a comprehensive Federal policy toward flood prevention and control on a national scale. Initially, this policy advocated the use of both structural projects and nonstructural land management measures. In time, however, the structural approach became the preferred federal means of flood control. This structural dominance continued even as a number of flood hazard management experts began to voice--in the early 1950's--their belief that structural measures, alone, were not capable of mitigating the flood hazard.

THE NATIONAL FLOOD INSURANCE PROGRAM: THE TRANSITIONS YEARS (1968-1978)

In 1968, Congress created the National Flood Insurance Program (NFIP). The two major thrusts of the 1968 Act (as amended) were (and are):

- To make Federal flood insurance available to homeowners and business-owners already exposed to flood hazards; and
- To require as a condition of insurance availability adoption of specified hazard mitigation practices, including land use practices which restrict development on delineated flood-prone lands.

The Federal Insurance Administration, which was created by the act to administer the NFIP and is now part of the Federal Emergency Management Agency (FEMA), was charged with identifying all flood-prone areas of the United States and establishing actuarial insurance rates based on the degree of flood hazard risk.

LEGISLATIVE INITIATIVES FOR FLOOD HAZARD MITIGATION

In the early 1970's, in recognition of the seriousness of rising disaster relief expenditures, both Congress and the President took initiatives designed to give new momentum to disaster mitigation and non-structural flood control strategies.

Water Resources Development Act of 1974 (P.L. 93-251)

Section 73 of the Water Resources Development Act requires that Federal agencies give consideration to non-structural alternatives in the planning or design of any federal project. Federal agencies are authorized to assume at least 80 percent of the cost for these non-structural alternative including acquisition of floodplain lands for recreational, fish and wildlife, and other public purposes.

The Disaster Relief Act of 1974 (P.L. 93-28)

The Disaster Relief Act of 1974 established policies for the distribution of financial assistance during presidentially declared disasters.

EXECUTIVE BRANCH INITIATIVES FOR FLOOD HAZARD MITIGATION

Floodplains and Wetlands Executive Orders

On May 24, 1977, President Carter issued Executive Order 11988, Floodplain Management, and Executive Order 11990, Protection of Wetlands.

The Floodplains Order directs all federal agencies to provide leadership to reduce the risk of flood loss, minimize the impact of floods, and "restore and preserve the natural and beneficial values served by floodplains in carrying out its activities . . ." Each agency was instructed to avoid siting on a floodplain unless there was no reasonable alternative site. Where an action must take place in a floodplain, an agency must evaluate the potential effects of that action and take steps to minimize the activity's impacts on the floodplain.

The Wetlands Executive Order also stresses avoidance, consideration of alternatives, and minimization of damage to valuable natural systems (wetlands). Both orders are important to local communities; their implementation by federal agencies will affect the full range of Federal investment in local communities.

The Federal Emergency Management Agency

The most recent stage of increasing involvement of the Federal government in flood hazard management was the creation in 1979 of the Federal Emergency Management Agency (FEMA). Coordinating the hazard mitigation efforts of five related agencies, FEMA is now responsible for Federal planning coordination and oversight of emergency preparedness, response, and mitigation of natural and man-made disasters.

Together these Federal initiatives provide national recognition of the ever-increasing level of flood-related losses in this country and the need for a comprehensive, coordinated approach to flood hazard mitigation. These federal policies influence actions on the floodplains and must be taken into consideration in a community's flood hazard mitigation decisions.

II. COASTAL AND RIVERINE FLOODPLAIN MANAGEMENT: GUIDELINES FOR CONSERVATION OF RESOURCES AND PROTECTION AGAINST FLOOD HAZARDS

In both the riverine and coastal setting, ecological resources play an important role in flood hazard protection by buffering storms and moderating flood heights and velocities. Protecting these resources is frequently an effective flood hazard management strategy and should be a component of any community flood hazard management program.

Guidelines for resource protection recommended in Chapter 2 are based on the "design with nature" principle: planning for both hazards and resource management should start with an understanding of the forces of nature. While the specific application of this principle will vary from community to community--reflecting unique physical and ecological settings--five guiding management policies should apply in all flood-prone areas: manage the entire system; preserve the natural floodplain; protect the edge; preserve watercourses and wetlands; and restore damaged floodplain environments.

PART I: RIVERS

Running through the landscape as a corridor, rivers and the lands they drain form an important ecological management unit. An effective program of river flood hazard and ecological management should consider the river and its watershed as a system. Activities in every part of the river corridor--not just in its floodprone parts--affect river flood potentials and ecological functions and should be wisely managed.

River corridors extend from the stream's headwaters to the sea and across valleys from ridge line to ridge line of the drainage basin. Across the valley, the corridor can be divided into three places of concern--the river, floodprone lands, and the uplands. Within these places are natural resources that are of particular concern for their ecological and flood moderating values. These vital resources--wetlands and transitional features--require special management and protection.

To protect the natural flood-moderating and ecological values of the river corridor system, the following guidelines are recommended:

- Discourage alteration of the watershed terrain;
- Discourage stream channelization, straightening, diking, bulkheading, and riprapping in favor of nonstructural alternatives;

- Restrain activities such as excavation, filling, clearing, paving, grading, draining, or diking that alter the surface or hydrologic systems of wetlands;

- Require structures and access ways to be designed so that they do not degrade wetland function;

- Require protective buffer strips along wetlands edges;

- Require that all development be set back an appropriate distance from the "ordinary high water mark" of all streams;

- Require appropriate development standards wherever it is not feasible to include all transitional features and other vital resources in a protective buffer; and

- Restore natural river corridor values.

PART II: COASTS

Coastal management for the dual purposes of providing protection from flood hazards and conserving ecological resources should embrace the entire coastline and the watershed and inland hydrologic systems that it drains. Of greatest importance is the place where water and land interact--the coastal floodplain. Activities in every part of the watershed can affect coastal flooding, however, and should be included in a community's management program.

Like the river corridor, the coastal area can be divided into places of concern--the coastal basin, coastal floodprone lands, and upland areas. Within these zones are found a variety of vital resources, requiring special management considerations. The vital resources include barrier islands, beaches, dunes, wetlands, and special vegetative edge features.

The management policies applicable to coastal watersheds and hydrologic systems are also similar to those for riverine watersheds. Above all, alterations of the natural features of coastal areas should be discouraged. The other guidelines that follow, suggested in part I, are applicable to coastal watersheds:

- Discourage alteration of the watershed terrain;

- Discourage alteration of natural drainageways such as streams;

- Restrain activities that alter the surface or hydrologic systems of wetlands;
- Require structures and access ways across wetlands to be designed so that they do not degrade wetland functions; and
- Require protective buffer strips along wetlands and other vital resource edges.

The following additional guidelines are suggested to protect other vital coastal resources:

- Select locations for navigation channels and for removal and deposit of the dredged material to avoid adverse effects on basin floors and critical areas such as grass beds.
- Avoid removing sand from all parts of the beach system, including the shallow near shore zone;
- Maintain natural beach processes by discourging strucutres that adversely affect littoral (or ocean) sand transport;
- Prevent disturbance of dunes and dune vegetation by requiring building to be landward of the active dune; by restraining traffic over dunelands; and by prohibiting excavation and removal on dunes;
- Locate all structures inland of the beach;
- Discourage activities that physically alter the face or toe of banks and bluffs;
- Encourage the use of natural means of protection or property designed bulkheads to protect bank and bluff toes from erosion; and
- Encourage restoration of degraded vital resource areas such as wetlands, dunes, and beaches.

III. CREATING A COMMUNITY PROGRAM TO MANAGE FLOOD HAZARDS

Each community bears the principal responsibility for addressing flood hazards within its borders. Each needs to fashion its own flood hazard management program. No single model exists for a community flood hazard management program. The management program in a community should be tailored to the community's unique physical and institutional setting and should respond to the community's goals. But the overriding objective should be reducing flood losses and protecting natural systems, as discussed in the previous chapter, while avoiding unacceptable economic, social, and environmental costs.

Fashioning a community flood hazard management program is a complex process. To help communities about to undertake the process, two innovative flood hazard management programs are described in part I of this chapter. Part II then suggests a series of key questions communities should address in structuring their individual flood hazard management programs.

PART I. TWO INNOVATIVE FLOOD HAZARD MANAGEMENT PROGRAMS

The examples, Baltimore County and Charles River Watershed, are neither typical of community flood hazard management programs, nor are they model programs: communities vary too much to propose a "right" management program. The two examples do represent ambitious responses to local and regional flooding problems that illustrate the possibilities for mitigating flooding. These examples also demonstrate key elements of the community planning process and thus provide useful background for communities entering that process.

In Baltimore County, a program of acquisition and relocation of flood-prone homes, combined with regulation of the 100-year floodplain and stormwater management policies, has been undertaken without outside funding.

Along the Charles River in Massachusetts, a flood hazard management project combines natural systems preservation with structural flood control to achieve the multiple goals of flood control, habitat protection, and the provision of recreation and open space areas.

PART II: FLOOD HAZARD MANAGEMENT ISSUES

Like those leaders in Baltimore County and along the Charles River, community planners fashioning flood hazard management programs face a series of issues.

WHAT FLOOD HAZARDS DOES THE COMMUNITY FACE?

As discussed in chapter I, floods are natural events that, in interaction with man, can pose hazards to both life and property. The nature of a community's flooding problem, therefore, is dependent on both natural processes and on man-made factors.

To identify and understand their flooding problems, community planners need a variety of data. In most communities, a variety of flood data exists, ranging from historical accounts to detailed hydraulic studies. Technical and financial assistance, provided by State and Federal agencies, can help communitie evaluate and supplement these data. The major source of technica assistance for the community will often come through the National Flood Insurance Program.

In addition to flood data, a community needs to assemble information on the population and property at risk. Zoning, documents, master plans and tax maps are helpful in identifying the type and condition of existing or committed land uses in the hazard areas. Within the classes of existing uses, developed land, as well as preserved or regulated areas, should be identified.

WHAT ARE THE COMMUNITY'S GOALS FOR FLOOD HAZARD MANAGEMENT?

Before community leaders can put together a wise flood hazard management program, they must first decide what they want to accomplish--what their goals are.

A recent survey of communities participating in the National Flood Insurance Program indicates that most communities have adopted multiple goals for their flood hazard management programs. The goals most frequently adopted in surveyed communities were reduction of losses and protection of health and safety. Over 40 percent of the surveyed communities participating in the regular phase of the NFIP also cited preservation of natural areas and open space as community goals.

Another goal communities may wish to consider adopting is "divert development away from floodplain locations where practical." Adoption of a development diversion goal can help make community goals consistent with federal programs.

Goals for any community based effort, of course, cannot be set in a vacuum or by only one group of interests. Many people and organizations have a stake in the goals established for floodprone lands, including: financial leaders; environmenta conservation leaders; emergency preparedness civic organizations; and general pupose civic organizations.

HOW DO EXISTING PROGRAMS AND REGULATIONS RESPOND TO THE FLOOD HAZARD IN THE COMMUNITY?

In choosing strategies to achieve flood hazard management goals, community planners need to consider existing programs and regulations. An inventory of these programs and regulations, therefore, should be undertaken. Such an inventory would likely include review of existing zoning, subdivision, and building codes as well as review of State enabling legislation.

WHAT STRATEGIES AND TOOLS ARE AVAILABLE TO ADDRESS FLOOD HAZARDS?

There are three basic approaches to flood hazard management: (1) modify the flood itself, (2) modify man's susceptibility to flood damage; and (3) modify the impacts by distributing the losses (i.e., through insurance and disaster relief).

Reducing man's susceptibility to flooding involves adjusting building practices and land uses in hazard areas, and protecting natural systems that moderate flooding. For puposes here, the strategies to accomplish these objectives can be divided into five groups: planning; regulation; acquisition/redevelopment; public information/education; and economics.

WHAT FLOOD HAZARD MITIGATION STRATEGIES ARE MOST APPROPRIATE FOR THE COMMUNITY?

Using all the information gathered on the flooding problem and on available management strategies, community planners are in a position to select specific measures to meet flood hazard management goals.

In choosing among flood hazard management alternatives, community planners will need to consider social, economic, and environmental impacts of the alternative. Some impacts, of course, are beneficial. The most common benefits derived from flood hazard management programs are reduction in flood losses, improved safety, increased recreational opportunities, and protection of natural systems. Other impacts can be detrimental. Frequently cited "costs" of flood hazard management include reductions in some property values, rsulting in reductions in assessed valuations, and increased costs of construction in hazard areas.

Though evaluating the costs and advantages of flood moderation approaches appears to be a formidable job, this type of evaluation is no different from that involved in any other community decision. Careful evaluation of the flood problem the community setting, and alternative management strategies within a broad community forum should result in the "airing" of critical trade-offs and enable the community to choose a course of action compatible with its flood problem and broader community needs.

The ultimate success of any community flood hazard management program is dependent on this broad-based community support and on the effectiveness of the institutions assigned enforcement responsibilities.

IV. THE NATIONAL FLOOD INSURANCE PROGRAM

WHAT IS THE NFIP?

The NFIP provides basic flood hazard data and a flood hazard management framework for every flood-prone community in the United States. The NFIP program offers insurance coverage and other benefits to local communities if they undertake certain flood hazard mitigation steps.

INSURANCE

Flood insurance becomes available to the community whenever an application to participate in the National Flood Insurance Program is made to FEMA. Insurance coverage is made available in two stages. Before completion of mapping showing the risk zones on which actuarial rates can be based, a first layer of coverage at subsidized rates is available. This period, from the start of community participation in the NFIP to the completion of the detailed mapping study (the Flood Insurance Study) is the Emergency Program. When detailed flood hazard risk studies are completed, and communities agree to undertake additional hazard mitigation responsibilities, a second layer of additional coverage becomes available at actuarial rates. This phase of the communities' participation in the NFIP is the Regular Program.

New Directions in Insurance: Coastal

With the issuance of the FEMA wide rule to implement the floodplains and wetlands Executive orders, new policies have been set in place that will affect flood insurance rates in the future.

Beginning February 1, 1981, newly constructed or substantially improved structures in coastal high hazard areas (V zones)* will be individually rated to withstand damage from the base flood. (The base flood is the 100 year frequency storm for most activities, and the 500 year frequency storm for critical activities--activities for which any risk of flooding is too great).

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* The Federal Insurance Administration must identify all coastal high hazard areas by October 1, 1981.

Flood related factors that must be considered in individual insurance ratings include flood risk, flood related erosion risk, soil composition, stability of structure. In addition, the base flood elevation will be the designated wave height.

In the past, actuarial rates in V-zones have been based solely on the relationship of the first-floor elevation of the structure to the base-flood elevation. The base-flood elevation in coastal areas has been the still-water surge of the storm having a 1 percent chance of occurrence in any given year and has not included wave height and runup. In addition, actuarial rates have before been unrelated to other factors that affect the actual flood risk exposure of a building in an exposed coastal location--i.e., flood related erosion, etc. Now wave height and other factors that relate to risk exposure will be used to determine the actuarial rate for each structure.*

FLOOD HAZARD MITIGATION **

The flood mitigation measures required of communities participating in NFIP are also staged, depending upon the amount of flood information provided to the community.

Required flood hazard mitigation activities during the Emergency Program relate to the issuance of building permits and certain development activities, such as subdivisions. In the absence of engineering data, the community must develop a process for case-by-case consideration of developments in known flood-prone areas. In addition, the community is urged to gather the best available data on flood boundaries and elevations.

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* Although the legal definition of new buildings is tied to the date a community enters the NFIP Regular Program (and adoption of the Flood Insurance Rate Map), when there is a change in the FIRM and a change in the base-flood elevation, structures built before that change are subjected to the rates in effect when they were first eligible for insurance.

** Defined as action taken to minimize flood damage potential.

During the community's participation in the Regular Program, floodplain management requirements which are tied to the amount of information provided by FIA, cover land use in high hazard areas where new development should be restricted. These specific areas are identifed on maps given to the community by FIA. Information on these same maps usually establishes the heights to which structures have to be elevated and/or floodproofed.

WHO ARE THE ACTORS IN NFIP AND WHAT ARE THEIR ROLES?

THE COMMUNITY

Responsibility for implementing the NFIP rests with the community. As defined by NFIP regulations, a community is any political subdivision or area of a State with authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction. The word "community" as used in the NFIP program can refer to a State, to a county, to a municipality, or to any other political subdivision with authority to implement the NFIP requirements. The role of specific actors within communities is described in chapter IV.

STATE GOVERNMENT

The State has several roles in implementing the National Flood Insurance Program. State properties and buildings are eligible for flood insurance if they meet certain NFIP standards.

State government also plays a key enabling role in the area of floodplain management. Many activities that local governments are required to carry out as conditions for their participation in the NFIP must first be allowed by State law (see chapter VII, Legal Considerations). State agencies can also require more restrictive regulations than those required by the NFIP.

FEDERAL GOVERNMENT

The NFIP is implemented through the Federal Insurance Administration, which is a component of the Federal Emergency Management Agency (FEMA).* FEMA has both national staff (located in Washington) and regional staff working in each of the 10 Federal regions (figure I). At the regional level the FEMA staff responsible for the implementation of the NFIP are found within the Office of Insurance and Mitigation. Both the regional and national staff include engineers, planners, and hydrologists; all play critical roles in implementing the NFIP at the community level.

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* Until the creation of FEMA in 1979, the Federal Insurance Administration (FIA) was a component of the Department of Housing and Urban Development (HUD). With the reorganization of disaster related programs into FEMA, FIA became a division of FEMA. All NFIP rules and regulations have been recodified as FEMA regulations. (44 CFR, Chapter I, Subchapter B) A Federal Insurance Administrator, retains primary responsibility for the program's implementation at the national level.

Other Federal agencies are also involved in floodplain management and implementing the NFIP at the community level. The U.S. Army Corps of Engineers, the Soil Conservation Service and the Tennessee Valley Authority are three other principal Federal agencies that have technical assistance programs for floodplain management (see appendix A, chapter III). In addition, these and several other agencies contract with FEMA to conduct some of the basic engineering studies that bring communities into the NFIP's Regular Program.

PRIVATE ORGANIZATIONS

Private organizations are involved both formally and informally in implementing the NFIP nationally. Engineering firms frequently are awarded contracts to prepare the flood insurance studies that enable communities to participate in the NFIP Regular Program. Other organizations provide technical services under contract to FEMA. Private consulting firms conduct technical studies that often precede changes in regulatory direction. Businesses and environmental organizations monitor policy shifts that affect the implementation of the NFIP.

HOW DOES A COMMUNITY PARTICIPATE IN THE NFIP?

IDENTIFICATION AND APPLICATION

For most communities in the United States, involvement with the NFIP began in the early to mid 1970's. First, these communities were identified by the Federal Insurance Administration as flood prone (i.e., having areas subject to at least a 1 percent annual chance of flooding.

After a nonparticipating community has been identified as floodprone, or wishes to become eligible for flood insurance coverage, community officials apply to FEMA for admission to the Emergency Program.

If the nonparticipating community has been given a flood hazard boundary map, it has 12 months to join the Emergency phase of the NFIP and adopt the required floodplain management regulations. The steps for community involvement in the NFIP are summarized in Table I.

Figure I

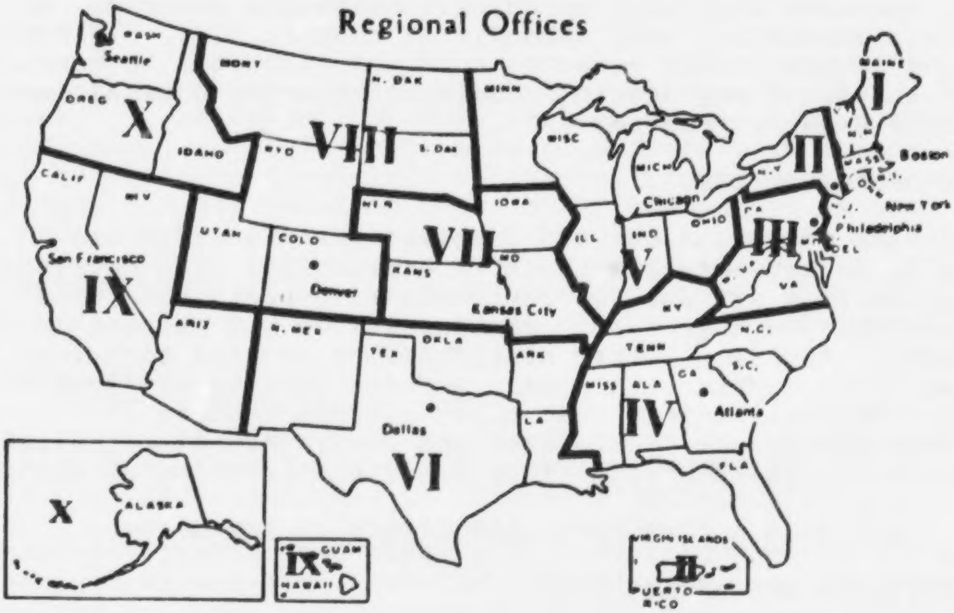
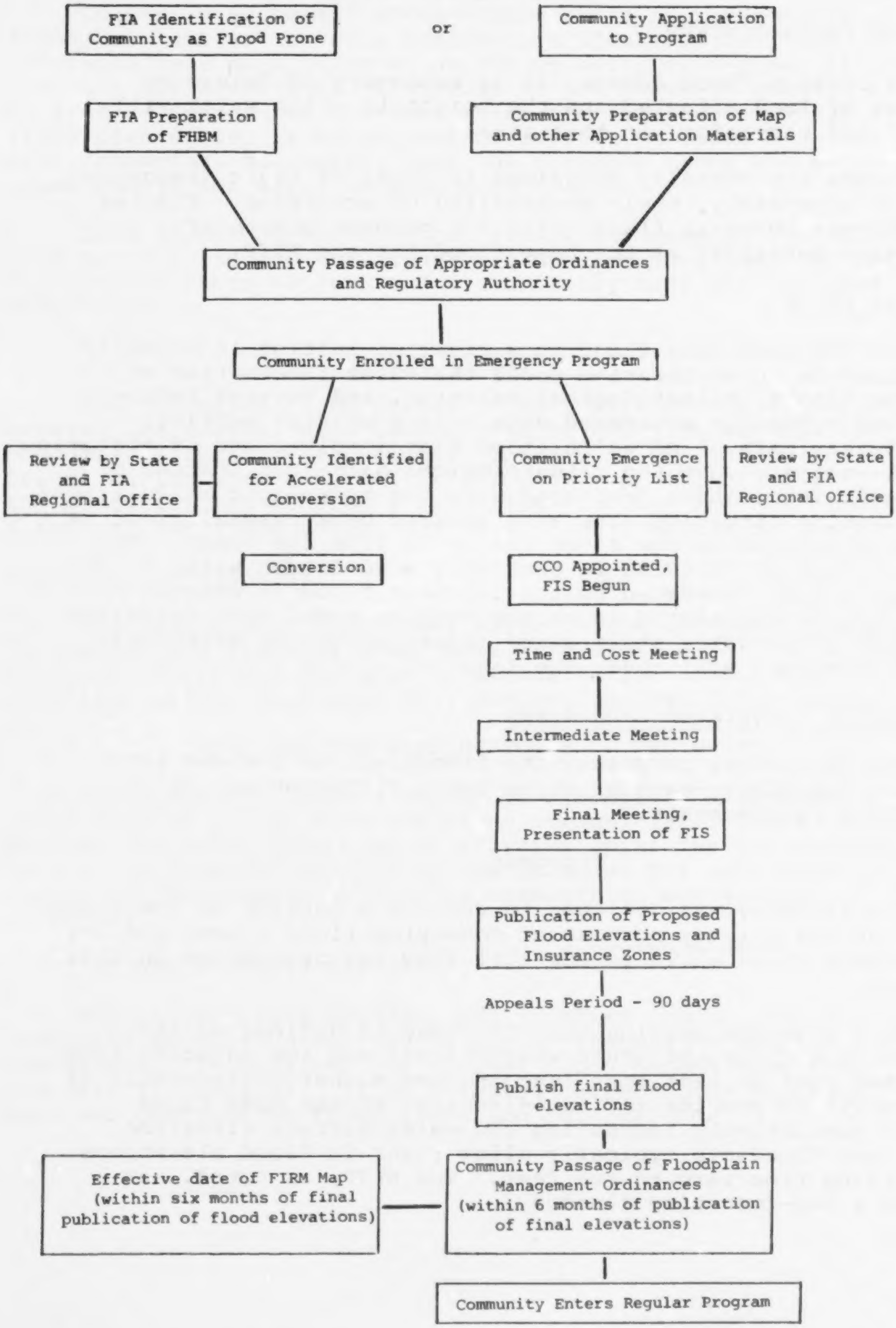

Regional Offices
WASH
Seattle
OREG
X
IDAHO
MONT
WYO
VIII
N. DAK
S. DAK
MINN
WISC
MICH
Chicago
MAINE
I
N.H.
MASS
Boston
R.I.
CONN
II
N.Y.
N.J.
New York
PA
Philadelphia
III
DEL
W. VA
VA
OHIO
IND
ILL
V
IOWA
NEB
VII
KANS
MO
Kansas City
CALIF
NEV
San Francisco
IX
UTAH
COLO
Denver
ARIZ
N. MEX
TEX
OKLA
Dallas
VI
ARK
LA
KY
TENN
N.C.
S.C.
GA
Atlanta
ALA
MISS
IV
FLA
ALASKA
GUAM
HAWAII
VIRGIN ISLANDS
PUERTO RICO

TABLE I

Steps for Community Involvement in the NFIP


FIA Identification of Community as Flood Prone
or
Community Application to Program
FIA Preparation of FHBM
Community Preparation of Map and other Application Materials
Community Passage of Appropriate Ordinances and Regulatory Authority
Community Enrolled in Emergency Program
Review by State and FIA Regional Office
Community Identified for Accelerated Conversion
Community Emergence on Priority List
Review by State and FIA Regional Office
Conversion
CCO Appointed, FIS Begun
Time and Cost Meeting
Intermediate Meeting
Final Meeting, Presentation of FIS
Publication of Proposed Flood Elevations and Insurance Zones
Appeals Period - 90 days
Publish final flood elevations
Effective date of FIRM Map (within six months of final publication of flood elevations)
Community Passage of Floodplain Management Ordinances (within 6 months of publication of final elevations)
Community Enters Regular Program

WHAT ARE THE BASIC REGULATORY CONCEPTS AND TOOLS OF COMMUNITY PARTICIPATION IN THE NFIP?

THE BASE FLOOD CONCEPT

To predict flood damage, it is necessary to determine the area of land affected and the height to which water will rise (flood elevation) in that area.

Floods are normally described in terms of their frequency (or more accurately, their probability of occurring. FIA has selected the 100-year flood (with a 1 percent chance of occurrence annually) as the base flood for the NFIP.

100-Year Flood

The 100-year base flood in a riverine setting is normally determined on an engineering model that uses information on historic floods, climatological patterns, and current hydrologic and hydraulic watershed data. In a coastal setting, the 100-year base flood calculation also involves use of historic records--ocean gauges and climatological data--but instead of the runoff information developed from the hydrologic calculations of a riverine situation, the area covered by a coastal flood is generally related to the storm coming in from the ocean. (The cause of coastal flooding is generally wind-driven water.) The geographic area inundated by the 100-year flood in coastal situations is calculated in an engineering model that estimates where the still-water storm surge (usual height of astronomic tide plus surge) will cover the land.

Floodplain: Regulated Land Areas

For regulatory purposes, the floodplain is divided into parts or districts--each of which has a different set of regulatory requirements.

Floodway

The floodway was designed to reserve a portion of the floodplain for the primary purpose of conveying flood flows, and any development which would impede this flow was prohibited in this district.

In a riverine setting, the floodway is defined as the channel of a river (or other watercourse) and the adjacent land area that must be kept open (unconfirmed either horizontally or vertically) to provide for the discharge of the base flood without cumulatively increasing the water surface elevation. Regulatory floodways typically allow rises in flood elevations of anything from zero to two feet. The NFIP, as noted, has adopted a one-foot-rise floodway.

Coastal High Hazard Areas

Coastal high hazard areas--those parts of the coastal floodplain subject to wave action--are identifed on flood insurance rate maps (FIRM's) as the velocity or V-zones since they are the areas most vulnerable to the force of coastal storms An area is designated a V-zone where the still-water storm height (tide plus surge) is sufficient to support at least a 3-foot wave, assuming, of course, that the distance along the water is great enough for waves to gain such height.

It's important to note that elevations used in the velocity zone in Atlantic and Gulf Coast communities have thus far been still-water storm heights and historically have not included wave height.

Flood Fringe

The so-called flood fringe is that part of the floodplain between the coastal high hazard area or the floodway and the boundary of the 100-year flood. The amount of land in the flood fringe varies according to the topography of the community. If the community has adopted a zero-rise floodway for its floodway district, the flood fringe may be extremely narrow or nonexistent.

Regulated Development

All development that takes place in the 100-year floodplain in coastal and riverine areas must be evaluated for its impact on flood levels and designed to standards for elevation, flood proofing, and/or anchorage that protect against flood damage.

WHAT ARE THE WORKING TOOLS OF THE NFIP?

FIA makes available a number of floodplain management tools free of charge to flood prone communities. These tools provide the basic data base or starting point for the minimum regulatory program requried by the NFIP and for many other floodplain management activities communities may wish to undertake.

FLOOD HAZARD BOUNDARY MAP (FHBM)

The flood hazard boundary map is often provided to a community when it enters the Emergency Program or shortly thereafter. It outlines the special flood hazard area (the 100-year floodplain). It is prepared quickly from existing data and contains no flood elevation information.

FLOOD INSURANCE STUDY (FIS)

The flood insurance study is the detailed engineering study of flood hazards conducted by a qualified firm or government agency with the input of the community during a series of meetings. Its purpose is to identify and evaluate flood hazards and corresponding water surface elevations.

Flood Profiles

Flood profiles are contained in the flood insurance study. The flood profiles for riverine floods typically show the cross section elevation of the stream bed and the 10-year, 50-year, 100-year, and 500-year flood at specific intervals along the stream.

Flood Boundary and Floodway Map

The flood boundary and floodway map is a major floodplain management tool in riverine communities. It identifies the boundaries of the floodway and of the 100- and 500-year flood. This map may also contain ground elevation information at a few places, as well as the cross section location of flood elevation (profile) information from the flood insurance study.

Flood Insurance Rate Map (FIRM)

Flood insurance rate maps divide the flood hazard area into risk zones from which actuarial rate are established.

MAP LOCATOR SYSTEM

The FIA is planning to institute over several year a map location service. Lending institutions, insurance agents, and real estate brokers will be able to call a central toll-free number to determine the degree of flood hazard of a particular property or structure.

WHAT ARE THE COMMUNITY REQUIREMENTS OF THE NFIP?

Community involvement in the NFIP can be viewed as a continuum in which, as new data are acquired, new requirements are imposed. Community participation and requirements begin as a community is identified as flood-prone and enters the Emergency Program. Table II provides a summary of NFIP program requirements.

Table II

SUMMARY*

NFIP PROGRAM REQUIREMENTS

Data Available to Community	Summary of Additional Program Requirements
EMERGENCY PROGRAM	
Flood Prone - No Map	1. Community-wide building permit system allowing case-by-case evaluation of flood hazard. 2. General performance standard applicable to activity in flood-prone areas to ensure: • structural safety; • minimization of damage; • protection of utilities.
Flood Prone with Flood Hazard Boundary Map	3. Obtain base flood elevation data from best available source. 4. Application of elevation and/or floodproofing requirements to new construction and substantial improvement and repair in flood-prone areas (based on best available data). 5. Mobile home anchorage requirements. 6. Maintain carrying capacity of channel. 7. Notify adjacent communities of alterations in water course.

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* This chart merely summarizes requirements. It does not list all of them, nor does it make necessary regulatory distinctions between residential and non-residential developments, or between existing and new structures. For a fuller description of requirements, see text beginning on page 65, and the NFIP program regulations referenced in the footnotes.

TABLE II (continued)
SUMMARY*
NFIP PROGRAM REQUIREMENTS

Data Available to Community	Summary of Additional Program Requirements
REGULAR PROGRAM	
Base Flood Elevation Provided - No Floodway or Coastal High Hazard Area Identified	8. Elevation and/or floodproofing requirements for new construction for substantial rehabilitation and repair, and for mobile homes. 9. Certification of structural integrity or floodproofing by professional engineer. 10. Demonstrate that new developments in 100-year floodplain do not increase base flood more than one foot.
Base Flood Elevations Plus Designation of Floodway	11. Adopt regulatory floodway. 12. Prohibit any activity inside regulatory floodway which would raise base flood. 13. No new mobile homes in mobile home parks in floodway.
Base Flood Elevations Plus Coastal High Hazard Area (Velocity Zone)	14. Anchorage plus certification of structural integrity by engineer. 15. Elevation above wave height. 16. Use of open breakaway walls in space below lowest floor. 17. No use of fill for elevation in Velocity Zone. 18. Protection of mangrove stands and sand dunes.

* This chart merely summarizes requirements. It does not list all of them, nor does it make necessary regulatory distinctions between residential and non-residential developments, or between existing and new structures. For a fuller description of requirements, see text beginning on page 67, and the NFIP program regulations referenced in the footnotes.

V. NEW INITIATIVES FOR THE FEDERAL EMERGENCY MANAGEMENT AGENCY

National policies now being implemented by FEMA promise to influence, in important ways, the activities of flood-prone communities. Two shifts in FEMA policy are particularly important. They are: FEMA's response to the floodplains and wetlands Executive orders; and new initiatives by FEMA to take advantage of post-disaster opportunities for hazard mitigation.

FEMA ORGANIZATIONS: DRR AND FIA

One major purpose of creating the Federal Emergency Management Agency was to coordinate and centralize federal efforts to encourage long-term disaster mitigation. FEMA brought under its umbrella two previously separate agencies with closely related disaster mitigation missions: the Federal Disaster Assistance Administration (now FEMA's Office of Disaster Response and Recovery--DRR), and the Federal Insurance Administration (utilizing the same title within FEMA). As suggested by Table I, both DRR and FIA are responsible for a variety of actions that directly and indirectly affect the manner in which individual communities address flood hazard problems.

FEMA AND THE FLOODPLAINS AND WETLANDS EXECUTIVE ORDERS

On September 9, 1980, FEMA issued final regulations in response to the Floodplains (11988) and Wetlands (11990) Executive orders. These regulations are applicable to all of FEMA's actions, the interim rule will eventually affect the full range of activities before, during and after a flood disaster which are conducted by DRR and FIA. The new regulations apply to activities in flood hazard areas. In addition, actions outside a floodplain or wetland, but which affect those areas, are also covered.

The Eight-Step Process

The interim rule establishes an eight-step decision-making process modeled on Water Resources Council guidelines, for evaluating activities on the floodplain. The eight steps are as follows:

Step 1 - Determine if action is located in a wetland and/or the 100-year (or, if appropriate, due to the nature of the action, 500-year) floodplain.

Step 2 - Early public notification and involvement in the decision.

Step 3 - Identification of practicable alternatives.

Table I

	Pre-flood	During Flood	Post-flood
NFIP (adminstered by (FIA)	1) Insurance 2) Floodplain management regulations (building standards and land use requirements) 3) Develop hazard mitigation plans	1) Requirements for community emergency warning and evacuation plans (for mobile homes only)	1) Processing insurance claims 2) Relocation assistance out of floodplain 3) Identification of hazard mitigation opportunities and provision of technical assistance to meet desired objectives 4) Oversee community implementation of floodplain management regulations
Disaster Relief (administered by DRR)	1) State emergency preparedness plans 2) State flood hazard mitigation plans	1) Appointment of Federal Coordination officer 2) Provision of emergency food, shelter, medical assistance 3) Debris clearance 4) Protective measures 5) Emergency communications and utility repair	1) Damage survey report 2) Assistance to community in preparing applications for disaster relief 3) Imposition of hazard mitigation conditions in giving disaster relief 4) Overseeing implementation of hazard mitigation conditions imposed for receipt of disaster

Step 4 - Identification of the full range of direct and indirect impacts that would result from the action.

Step 5 - Identification of measures to minimize adverse impacts and to restore, preserve, and enhance the natural beneficial values of floodplains and wetlands.

Step 6 - Reevaluate the proposed action in light of its impact and determine it it is truly the only practicable location.

Step 7 - Publicly explain for any final decision why the floodplain or wetland is the only practicable alternative.

Step 8 - Monitor implementation of any floodplain or wetland action to ensure that minimization requirements are fully implemented.

Standards to Minimize Flood Damage

In addition to this eight-step process, the FEMA rule prescribes substantive standards for the minimization of flood damage. These minimization standards are slightly different for the different kinds of hazard mitigation activities conducted by DRR and FIA. They are mutually supportive and together will form a strong framework for flood hazard mitigation, particularly in the highest hazard areas--the riverine floodway and the coastal high hazard area.

NEW INITIATIVES IN THE POST-DISASTER SETTING

Immediately following a major flood, thousands--sometimes millions--of federal dollars flow into a community to assist recovery. In the past, this recovery has focused on rebuilding the community in the same place and frequently in the same manner as before the flood. Many people concerned with flood hazard mitigation are now looking at the post-flood situation as an opportunity to reduce susceptibility to future flood hazards. One of the major purposes for the creation of FEMA was to encourage hazard mitigation in disaster situations. A common leadership directed toward hazard mitigation should ensure a profitable marriage between the flood hazard management expertise of FIA and the disaster response expertise of the Office of Disaster Response and Recovery.

On July 10, 1980, the Director of the Office of Management and Budget (OMB) in the Executive Office of the President, signed a directive on Flood Disaster Recovery. This directive provided for FEMA leadership in an interagency task force aimed at promoting the use of common flood disaster planning and post-flood recovery practices by all Federal and state agencies operating into an interagency agreement providing for interagency, interdisciplinary, and intergovernmental hazard mitigation teams to operate in post-disaster situations.

DISASTER RELIEF AND FLOOD HAZARD MITIGATION: SECTION 406

Communities receive federal assistance for pre-disaster contingency planning through the National Flood Insurance Program. In addition, FEMA has major responsibilities in the disaster situations.

As discussed in Chapter I, Section 406* of the Disaster Relief Act of 1974 specified that disaster loans and grants be conditioned to ensure that (1) building repairs are in accordance with acceptable safety standards, and (2) actions are taken to reduce future susceptibility to natural hazards, "including safe land use and construction practices . . . ". Many of the substantive requirements for the implementation of Section 406 will flow from FEMA's implementation of the floodplains Executive order.

HAZARD MITIGATION OPPORTUNITIES

FEMA staff identify two major mitigation opportunities in post-disaster situations: flood protection of damaged structures and relocation of substantially or repetitively damaged structures.

FEDERAL INSURANCE ADMINISTRATION: RELOCATION STRATEGIES

During the past few years, FEMA has developed its own strategies to support the relocation of certain flood damaged properties out of the floodplain, and to acquire certain properties in flood risk areas so that these properties may be maintained in open space usage. The two strategies described below are:

- An insurance payment strategy (called Constructive Total Loss) that allows the owner of a severely damaged property to be paid an insurance payment as if the property has been totally destroyed. Thus made economicaly whole, the owner of a severely damaged structure may be able to move his/ or herself out of the flood risk area.

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* The single largest source of federal disaster assistance is funded under the Act, now implemented by FEMA.

- A comprehensive strategy purchase for the purpose of maintenance of open space uses certain severely and repetitively damaged properties (with authority derived from Section 1362 of PL 90-448 as amended).

The long-term recovery of the area will often be dependent upon actions taken during the immediate post-disaster period to minimize the community's exposure to future flood hazards.

Specialists in natural disaster recovery planning identify four overlapping periods in the recovery process. It is useful to examine these periods in terms of their hazard mitigation opportunities.

1) Emergency period -- search and rescue activities take place, emergency feeding and medical attention, housing and debris removal.

2) Restoration period -- restoration of public utilities, housing, and commercial and industrial structures. Damage Survey Reports are conducted.

3) Reconstruction I -- rebuilding capital stock to pre-disaster levels.

4) Reconstruction II -- activity focuses on commemorative activities, betterment, and development.

The challenge of the post-disaster recovery period is to develop mechanisms that allow the decision maker to take a broad view of the emergency situation and avoid making decisions that lock the community into a set of actions that ensure repetition of the disaster. The key to many communities' ability to make appropriate post-disaster mitigation decisions may well lie in effective contingency planning before the disaster.

VI. PUBLIC INVOLVEMENT IN COMMUNITY FLOOD HAZARD MANAGEMENT

Citizen participation is an essential element of democratic government. Citizens' involvement can contribute significantly to the improvement of government decision-making. This reason alone has resulted in the increase over the last decade in Federal compliance requirements for substantial citizen participation in the development and/or management of a variety of programs, including flood hazard mitigation. Such legal requirements aside, public involvement in planning a community flood hazard management program can be highly productive.

INCORPORATING PUBLIC VALUES TO MAKE BETTER PLANS

A community's residents often have a more intimate understanding of particular community problems than the technical experts or consultants working on a project. Citizens know a community's goals and can best determine how a flood hazard management program should mesh with these and give them new definition. Since they will be the ones to experience the impact of any adopted program, they are in the best position to decide the future of their community. Citizens' input, thus, will assure that any plan developed will be better than one one involving taxpayers.

GAINING VOTER SUPPORT AND RESOLVING CONTROVERSIES

In many communities, voter approval will be needed to adopt and implement a flood hazard management program. Controversial issues are bound to arise during the development of a community flood hazard management program. It is far better to debate publicly these issues early in the planning process, rather than later, so that reasonable compromises can be worked out. Voters who have taken part in planning and who feel they have had a chance to influence decision making will most likely support the program and encourage their friends, neighbors, and community organizations to do the same. This caring can translate into assistance from citizens in monitoring the implementation of the program, as well as support for hard political decisions made during the course of implementation.

The real payoff of governmental/civic leader partnership may come in the form of other long-term community benefits that go beyond flood hazard mitigation. Citizens who participate in planning a project will develop a sense of continuing responsibility for it. They will expend the extra effort to secure added benefits--recreation, natural resource conservation, and so on--that make the difference between an ordinary flood control program and an outstanding one.

CAMPAIGNING FOR CITIZEN PARTICIPATION

An effective citizen participation program requires major commitments from local officials and agency staff members and from civic-minded citizens. It is likely to cost both private time and public money. Citizen involvement might initially mean delays in implementing the local flood hazard management program. In the long run though, public involvement should contribute to a better program--more reflective of community needs and goals and, what is most important, more likely to be supported by the voters and taxpayers.

When designing a civic leader public participation component of a community flood hazard management program, several key issues must be addressed:

PURPOSE, ROLES, AND RESPONSIBILITIES

Both the purpose of public participation program and the roles and responsibilities of the participating public leaders and local governmental officials must be determined and be stated clearly at the start of planning to avoid misunderstandings and even anger later.

LEGAL CONSIDERATIONS

Several legal considerations must be accounted for in the development of a public involvement program. These include:

- o The regulations and guidance issued by Flood Insurance Administration to implement the National Flood Insurance Program which included several requirements for public notification and community coordination/consultation during production of the Flood Insurance Study.
- o The requirements of the floodplains Executive order (11988) which applies to all Federal agencies that either directly or indirectly influence action that might affect floodplains. Public involvement is a key provision in the eight-step decision-making process required under the order's implementation guidelines.

TARGETED INTERESTS

One of the more difficult questions local officials face when developing a public participation program is "Who are the public to be involved?" This question leads to several additional questions: Is the public those "interested" citizens who are already involved in local decision-making processes or those who have an economic stake in a final decision? Are these citizens truly representative of the broader public interest? If not, how can others be identified who could or should be involved?

The final flood hazard management program selected is likely to affect a significantly or be of interest to a number of different interest groups within a community. Civic and government actors designing a public participation program should keep the various interest groups in mind. These interests include: economic interest such as insurance agents and mortgage lenders; environmental/conservation groups; floodplain residents; members of local service organizations such as the Red Cross; and the general taxpayers.

ISSUES FOR PUBLIC INVOLVEMENT

Determining just what issues and questions the public can help resolve in the course of the public participation program requires attention to two important matters:

Officials designing a public involvement component of a flood hazard control program should take care that the citizens who eventually volunteer their time and energy to find acceptable flood control solutions are not overworked.

Having become sensitized to matters of timing, scheduling, and other constraints of budget and training, officials must then determine at what points the public should be involved. At each step in the community decision-making process, a number of opportunities occur for involving the public in decision making. Public involvement is an essential element: in goal setting; at several points in the data gathering process; during identification of alternative flood mitigation strategies; in the selection of a program; and during the selection and assignment of institutions to implement the flood control program.

STAFF AND MATERIAL RESOURCES FOR PUBLIC INVOLVEMENT?

Just as public participation program designers need to be aware of the scheduling and budgetary restraints in relation to volunteers, so do they need to consider staff resources and funds and the availability of resource help, materials, and facilities in developing a public involvement component. To some extent, these factors will determine the scope of the public participation effort. However, although it is important to be realistic about what is possible, program developers should not hold back from undertaking a suitable program because of seemingly limited human and financial resources. What may seem like a sizable short-term investment could have long-term benefits that far outweigh the initial time and commitment costs.

THE PUBLIC PARTICIPATION TOOLS

Public participation can be achieved in a wide range of activities designed to inform and involve the public. Most of the mechanisms of public participation fit into one of three categories, as shown in table VI-1. Each of these tools is described in detail in Appendix B of this Summary Guide.

Table VI-I *

Mechanisms of Public Participation in Flood Hazard Control

Education/Information	Review/Reaction	Interaction/ Dialogue
Newspaper Articles	Public Hearings	Workshops
Radio and TV programs	Survey Questionnaires	Special Taks Forces
Speeches and Presentations	Public Inquiries	Interviews
Field Trips	Public Meetings	Advisory Boards
Exhibits		Informal Contacts
School Programs		Study Group Discussions
Films		
Brochures		Seminars
Newsletters		
Reports		
Letters		
Conferences		

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* Katharine P. Warner, "Public Participation in Water Resources Planning," University of Michigan, Ann Arbor, 1971.

POSSIBLE OBSTACLES

The development of a working public involvement program in a community may well require perserverance on the part of informed community leaders. Citizens will want to work closely with the local officials and with the planning staff to ensure that public involvement programs: closely track the decision-making process; identify important community issues; and target the important affected and interested public in a community.

While different projects and activities generate different levels of interest in the community in many cases, a community leader will be able to encourage public involvement by pointing out to various groups how their interests coincide with or are affected by the flood hazard management planning process.

REWARDS OF PARTICIPATION

Public involvement in the flood hazard management planning process does bring rewards. The ultimate purpose of public involvement in flood hazard management planning is mitigation of current and future community flood hazards at a lower environmental, economic, and social cost.

VII. THE LEGAL CONSIDERATIONS IN SELECTING COMMUNITY STRATEGIES FOR FLOOD HAZARD MITIGATION

Local governments have significant powers to mitigate flood hazards. Power to regulate, tax, and acquire property enable a community to select confidently among the array of available strategies. These strategies, however, are not without limits and some will be more effective than others in both hazard mitigation and courtroom challenges.

LEGAL RESPONSIBILITIES -- WHAT ARE COMMUNITIES REQUIRED TO DO?

Community responsibility to mitigate flood hazards generally originates from three different sources. Various Federal statutes and their implementing regulations require community flood actions. Some of these Federal laws deal directly with the problems of flood hazard mitigation, while others have an indirect impact in addressing closely related subjects. Through programs, regulations, statutes, and constitutional provisions, some State governments also require communities to act. Recent judicial developments that may hold local governments financially responsible for certain types of flood damages is the third source of community responsibility. The need to avoid costly suits and damages requires that localities take appropriate flood hazard mitigation actions.

Potential Local Government Liability Requires Flood Hazard Mitigation

Local governments are increasingly being held financially responsible for damages suffered by individuals in a range of areas including fire protection, earthquakes, and to a limited extent, flooding. Very few decisions exist thus far, but there are indications that localities may one day find themselves liable when they have not acted reasonably in mitigating foreseeable flood hazards.

Potential Liability

Inadequate Local Government Action

Local governments may be held liable for taking inadequate or negligent action with regard to flood hazards.

Local Government Inaction

Courts have generally not ruled on cases where there has been no action by a locality to mitigate flood hazards. Courts are typically reluctant to judge government responses that may be based on political considerations or trade-offs rather than on a knowing or negligent disregard for flood hazards.

Nonetheless, a local government might be held responsible to citizens for damages caused primarily by its failure to exercise reasonable care in anticipating a flood. Such an outcome might occur especially when State or Federal flood programs are offered and not complied with, and a history of flooding exists.

A Lack of Enforcement

A locality may also be liable for flood damages when it has established a flood program but fails to enforce it.

Responsibility to Adjacent Localities

With the emerging trend of regional responsibility, a local government could be liable for flood damages it causes to an upstream, downstream, or crossstream locality.

Elements of a Liability Suit

Generally, in suits for flood damages against localities, the party bringing the suit must show that the losses suffered were caused by the government's act or failure to act. Proving that the government's conduct caused the damages may be extremely difficult since so many other factors could have intervened to produce the flood damages. Nevertheless, once causation is demonstrated, courts will probably examine the "reasonableness" of the government's behavior. Reasonableness will be determined from surrounding circumstances, including an inquiry as to whether the flood and damages could have been anticipated (foreseeability), whether it was an ordinary or extraordinary flood, and the relative costs and benefits of government action versus inaction.

Ways to Avoid Liability

Several steps can be taken by a locality to significantly lessen the likelihood of being held liable for flood damages.

1. COMPLY WITH FEDERAL AND STATE FLOOD HAZARD PROGRAMS.
2. STATE CLEARLY THE FINDINGS, REASONS, AND BASIS FOR ACTION ON A REVIEWABLE RECORD.
3. BE FAMILIAR WITH APPLICABLE PRINCIPLES OF LIABILITY.
4. INSPECT AND DISCOVER HAZARDOUS CONDITIONS ON THE GOVERNMENT'S OWN PROPERTY.
5. USE A WARNING OR DISCLAIMER OF LIABILITY.

LEGAL AUTHORITY -- WHAT DO COMMUNITIES HAVE THE POWER TO DO?

The powers come from a variety of sources and four are particularly important in flood mitigation:

1. Regulatory powers are the most widely used and consist primarily of zoning, subdivision regulations, building code provisions, and disclosure laws.

2. Taxing powers provide for the use of such strategies involving tax incentives and disincentives and special floodplain assessments.

3. Spending powers enable expenditures for flood hazard mitigation purposes, including structural improvements, land acquisition, and regulatory enforcement among other strategies. Communities may be defeating the effect of strategies intended to restrict floodplain encroachment, however, by providing services and facilities to those areas. By putting sewers and building roads, localities may encourage development and use of that area. Thus, the more significant aspect of the spending power for flood mitigation may be the power not to spend.

4. Acquisition powers provide communities with the ability to purchase or comdemn complete parcels of land, arrange for easements or limited rights to land, and guarantee necessary access during a disaster for such things as mitigation efforts and relief.

LIMITATIONS -- WHAT CONSTRAINTS EXIST ON THE EXERCISE OF COMMUNITY POWERS?

Community powers are largely determined by constitutional doctrines, their sources, and judicial interpretations of each. The constitutional limitations and other special problems that may constrain various flood mitigation powers include:

Due Process

Due process is a constitutional guarantee which generally requires that a community exercise its powers in a reasonable manner. In more specific terms, due process requires the government action to be within the limits of its powers and for proper objectives. Additionally, the means used must be related to accomplishing the objective and in a manner which is not arbitrary.

The Taking of Property

Floodplain regulations generally limit land uses and construction. When the floodplain landowner's use of land is restricted by such regulations, has the government "taken" the land -- that is, unconstitutionally burdened that property without paying compensation?

If a court finds that a "taking" has occurred, it will generally invalidate the regulations as to the particular piece of property involved in the suit. Since the facts of each case largely determine the court's ruling, it is imperative that all facts supporting that community's action be brought forth to justify it.

Equal Protection

Equal protection in the floodplain context requires that a government have a valid reason for treating similarly situated lands differently. Parcels of land similar in elevation and distance from the stream cannot be regulated differently unless a rational reason exists.

FACTORS TO STRENGTHEN POWERS

Several methods exist for a community to avoid limitations on its power to mitigate floods and, in fact, increase its powers while possibly improving flood mitigation efforts. The concepts underlying these methods will not ensure judicial acceptance in every case, because not all community's have the same powers, nor do all courts interpret them in the same manner. In general, however, the following methods have enabled communities to exercise their powers in a number of different courts and contexts relating to floodplains.

1. COMMUNITY ACTIONS THAT ARE PART OF A LOCAL, REGIONAL, STATE, OR FEDERAL PROGRAM ARE STRONGER.

2. SOME COURTS GIVE INCREASED WEIGHT TO LAND USE REGULATIONS THAT CONCERN THE PROTECTION OF ENVIRONMENTALLY SIGNIFICANT AREAS AND VALUES.

3. A CLEAR AND DETAILED STATEMENT OF PURPOSES AND FACTS WILL STRENGTHEN THE PRESUMPTION IN FAVOR OF THE COMMUNITY ACTION AND ENABLE A COURT TO UNDERSTAND AND UPHOLD IT BETTER.

4. CAREFUL AND THOROUGH DRAFTING TO PERMIT AS MUCH DEVELOPMENT AS IS POSSIBLE, CONSISTENT WITH THE PURPOSE OF FLOOD HAZARD MITIGATION, WILL LESSEN THE LIKELIHOOD OF A SUCCESSFUL CHALLENGE.

VIII. INSTITUTIONAL CONSIDERATIONS IN IMPLEMENTING COMMUNITY STRATEGIES FOR FLOOD HAZARD MITIGATION

WHO ARE THE GOVERNMENT ACTORS AND WHAT DO THEY DO?

In a typical community today, a wide array of government officials at various levels and in various agencies perform flood hazard mitigation tasks and related assignments:

- Local governments exercise most land use planning and control, including floodplain regulation, setting basic land use patterns in an interaction with private market forces. Most floodplain regulatory strategies will need to rely on this existing network to a great degree.
- Regional planning agencies, such a metropolitan planning commissions and councils of governments, conduct regional comprehensive and special purpose planning and coordination, but have few, if any, implementation powers and do not regulate development.
- State governments are increasingly involved in floodplain management. Typically, States will adopt floodplain standards or guidelines to be implemented at the local level.
- Federal agencies perform diverse functions that both directly and indirectly influence floodplain land uses.

HOW TO DESIGN AN INSTITUTIONAL STRUCTURE FOR NEW FLOOD MANAGEMENT TASKS

A major aim of a floodplain management strategy is to assign to appropriate agencies the tasks that they can best perform and then provide some means to coordinate actions among them. Who performs flood management tasks is often as important as what functions are authorized, because the implementation can make or break the best floodplain management strategy. An awareness of implementation realities needs to be built into a proper strategy from its inception.

In assigning new flood management tasks to governmental institutions, five questions need to be answered:

1. By what criteria should a governmental system be judged in light of floodplain management needs?
2. What levels of government are best qualified to assume new tasks?
3. Within any one local government, what agencies should be assigned flood management tasks?

4. What should be the roles of elected officials, part-time citizen boards, and full-time public employees?

5. How can various agencies and governments that impact a single watershed be coordinated?

CRITERIA FOR ASSIGNING FLOOD MANAGEMENT FUNCTIONS

The great diversity of local, regional, and state governments in the United States precludes the existence of any single answer to the questions posed above. Rather than describing one institutional model to accommodate every circumstance, five goals, or normative criteria, are suggested here that can be used to judge a governmental structure. Ideally, governmental institutions, taken as a whole, should be:

(a) Administratively efficient;

(b) Politically acceptable;

(c) Economically effective;

(d) Politically accountable; and

(e) Equitable.

WHAT LOCAL GOVERNMENT ENTITIES ARE BEST QUALIFIED TO ASSUME NEW TASKS?

Each level of government has its own strengths and limitations. A coordinated local/regional/State/Federal flood management strategy will seek to take advantage of the abilities of each level of government and minimize the limitations.

THE ROLE OF POLITICS, PERSONALITIES, AND PROFESSIONS IN ASSIGNING FLOOD MANAGEMENT TASKS

The impact of structure and governmental form on floodplain programs can be significant. However, in assigning regulatory and other powers to various government agencies, structure may not be as important as the politics of the regulatory agency and the personalities and professions of the staff. These considerations are particularly important in deciding which agencies should regulate floodplain actions after the levels of government are selected.

WHAT SHOULD BE THE ROLES OF ELECTED OFFICIALS, CITIZEN BOARDS, AND PUBLIC EMPLOYEES?

State and local governments use a variety of citizen boards and commissions to administer zoning and other land use controls and to direct special districts and soil conservation districts. Some boards are elected, other appointed by the governor, the city or county council, or the mayor.

These State and local citizen bodies can be particularly useful in generating political support and voter acceptance for regulatory programs and in expanding citizen participation in decision making. However, citizens who serve part-time and who are usually unpaid are less effective in making decisions that require considerable technical expertise or investment of time, such as issuing permits, conducting surveillance, or bringing enforcement actions. For these reasons, boards composed of appointed or elected members should adopt goals and policies, while the day-to-day implementation of those policies should be left to professional technical staffs.

HOW CAN THE AGENCIES AND GOVERNMENTS THAT IMPACT A SINGLE WATERSHED BE COORDINATED?

Intergovernmental cooperation among municipal, county, regional, State, and Federal interests is a key to any effective strategy. Overcoming the vertical, functional, and horizontal fragmentation that characterizes government functioning vis-a-vis flood control is no easy task, since it is deeply rooted in governmental structures, laws, traditions, and political differences.

Intralocal or Functional Coordination

Within each local government where several agencies perform flood management tasks, a floodplain coordinator or lead agency is needed to coordinate these various tasks. The local governing body should designate one full-time official who is responsible and accountable for coordinating floodplain management programs, within his or her own government, ties to higher levels of government, and progress toward goals.

Intergovernmental or Vertical Coordination

Links should be provided between the community and State and Federal agencies. This connection might be provided by direct and frequent contact between the local coordinator and the State coordinating agency designated by the governor.

Interlocal or Horizontal Coordination

The most important type of collaboration in implementing a flood control program is among regulating local governments that share the same watershed. The range of techniques to secure area-wide approaches include: assigning regional council of local elected officials coordination review powers over major permits or construction activities; developing joint service agreements or joint regulations; authorizing local or interlocal special districts to undertake flood management tasks; transfering functions from municipalities to higher levels of government--the county or the State; joint acquisition programs; granting extraterritorial powers, by which local governmental floodplain regulatory powers extend over adjointing unincorporated land; and sharing of planning and engineering staffs.

APPENDIX A

GLOSSARY

GLOSSARY

ACTUARIAL RATES[1] - Insurance rates determined on the basis of a statistical calculation of the probability that a certain event will occur. Actuarial rates are also called "risk premium rates." They are established by FIA pursuant to individual community flood insurance studies and investigations that are undertaken to provide flood insurance in accordance with the National Flood Insurance Act and with accepted actuarial principles, including provisions for operating costs and allowances.

AREA OF SPECIAL FLOOD HAZARD [1] - The land in the floodplain within a community subject to a 1 percent or greater chance of flooding in any given year.

BARRIER ISLANDS [5] - Elongate seafront islands of sand formed by wave action.

BASE FLOOD (REGULATORY FLOOD) - The selected flood frequency for regulatory purposes. The NFIP has adopted the 100-year flood as the base flood to indicate the minimum level of flooding to be used by a community in its floodplain management regulations.

BERM - The horizontal portion of the backshore beach formed by sediments deposited by waves.

BOG [6] - A wetland usually developing in a depression or lake with poor drainage.

BOTTOMLAND HARDWOODS - Tree species that occur on water-saturated or regularly inundated soils. Classified as wetlands, these areas content both trees and woody shrubs.

BULKHEAD [5] - A vertical wall of wood, steel, or concrete, built parallel to the shoreline and designed to deflect waves and control erosion.

CHIEF EXECUTIVE OFFICER (CEO) [1] - The official of the community who is charged with the authority to implement and administer laws, ordinances, and regulations for that community.

COASTAL HIGH HAZARD AREA (CHHA) [1] - "Coastal high hazard area" means the area subject to high velocity waters, including, but not limited to, hurricane wave wash or tsunamis. The area is designated on a FIRM as Zone V1-30.

COMMUNITY [1] - Any State or area or political subdivision thereof, or any Indian tribe or authorized tribal organization, which has authority to adopt and enforce floodplain management regulations for the areas within its jurisdiction.

EMERGENCY PROGRAM [1] - The program as implemented on an emergency basis in accordance with NFIP. It is an interim program to provide a first layer of subsidized insurance before the detailed risk studies from which actuarial rates are computed have been completed.

ENCROACHMENT [4] - Any fill, structure, building, use, accessory use, or development in the floodway.

ENCROACHMENT/FLOODWAY LINES [4] - The limits of obstruction to flood flows. These lines are on both sides of and generally parallel to the river or stream. The lines are established by assuming that the area landward (outside) of the lines will ultimately be developed in such a way that it will not be available to convey flood flows.

EROSION [1] - The process of the gradual wearing away of land masses.

ESTUARY [5] - A confined coastal water body with an open connection to the sea and a measurable quantity of salt in its waters.

FIRST LAYER COVERAGE [1] - The maximum amount of structural and contents insurance coverage available under the NFIP Emergency Program.

FLOOD [1]/FLOODING [1] - A general and temporary condition of partial or complete inundation of normally dry land areas from the overflow of inland and/or tidal waters, and/or unusual and rapid accumulation of runoff of surface waters from any source.

FLOOD CONTROL WORKS - See FLOOD PROTECTION SYSTEMS.

FLOOD DISCHARGE [3] - The total quantity of water flowing in a stream and adjoining overflow areas during times of flood. It is measured by the amount of water passing a point along a stream within a specified period of time and is usually measured in cubic feet of water per second (cfs).

FLOOD FREQUENCY [3] - The frequency with which a flood of a given discharge has the probability of recurring. For example, a 100-year frequency flood refers to a flood discharge of a magnitude likely to occur on the average of once every 100 years or, more properly, has a 1 percent chance of being exceeded in any year. Although calculation of possible recurrence is often based upon historical records, there is no guarantee that a 100-year flood will occur at all within the 100-year period or that it will not recur several times.

FLOOD HAZARD [2] - The potential for inundation and involves the risk of life, health, property, and natural floodplain values.

FLOOD HAZARD BOUNDARY MAP (FHBM) [1] - An official map of a community, issued through the NFIP, where the boundaries of the flood, mudslide (i.e., mudflow) and related erosion areas having special hazards have been designated as Zone A, M, and/or E.

FLOOD HAZARD MANAGEMENT - Encompasses all local, State, and Federal activities taken before, during, and after a flood to reduce flood losses or in response to a flood disaster.

FLOOD INSURANCE [1] - The insurance coverage provided under the National Flood Insurance Program.

FLOOD INSURANCE STUDY (FIS) (FLOOD ELEVATION STUDY) [1] - An examination, evaluation, and determination of flood hazards and, if appropriate, corresponding water surface elevations, or an examination, evaluation, and determination of mudslide (i.e., mudflow) and/or flood-related erosion hazards.

FLOOD INSURANCE RATE MAP (FIRM) [1] - An official map of a community on which the FEMA has delineated both the special hazard areas and the risk premium zones applicable to the community.

FLOOD PROTECTION SYSTEMS (STRUCTURAL CONTROLS) [1] - Those physical structural works for which funds have been authorized, appropriated, and expended and which have been constructed specifically to modify flooding to reduce the extent of the area within a community subject to a "special flood hazard" and the extent of the depths of associated flooding. Such a system typically includes hurricane tidal barriers, dams, reservoirs, levees, or dikes. These specialized flood modifying works are those constructed in conformance with sound engineering standards.

FLOOD-RELATED EROSION [1] - The collapse or subsidence of land along the shore of a lake or other body of water as a result of undermining caused by waves or currents of water exceeding anticipated cyclical levels or suddenly caused by an unusually high water level in a natural body of water, accompanied by a severe storm, or by an unanticipated force of nature, such as a flash flood or an abnormal tidal surge, or by some similarly unusual and unforeseeable event which results in flooding.

FLOODPLAIN/FLOOD-PRONE AREA - Any land area susceptible to being inundated by water from any source (see the definition of "flooding").

FLOODPLAIN MANAGEMENT [1] - The operation of an overall program of corrective and preventive measures for reducing flood damage, including but not limited to emergency preparedness plans, flood control works, and floodplain management regulations.

FLOODPLAIN MANAGEMENT REGULATIONS [1] - Zoning ordinances, subdivision regulations, building codes, health regulations, special purpose ordinances (covering, for example, floodplains, grading, and erosion control) and other applications of police power. The term describes such State or local regulations, in any combination thereof, which provide standards for the purpose of flood damage prevention and reduction.

FLOODPLAIN PRESERVATION [2] - The prevention of modification of the natural floodplain environment or maintenance of the floodplain environment in a condition as close as possible to its natural state using all practicable means.

FLOODPLAIN RESTORATION [2] - The re-establishment of a setting or environment in which the natural functions of the floodplain can again operate.

FLOODPLAIN VALUES [2] - Those natural and beneficial attributes associated with the relatively undisturbed state of the floodplain, including values primarily associated with water, living, and cultural resources.

FLOOD PROOFING [1] - Any combination of structural and nonstructural additions, changes, or adjustments to structures that reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

FLOODWAY - That portion of the floodplain consisting of the stream channel and overbank areas needed to carry and discharge flood flows. The floodway is intended to carry the deep and fast moving water.

FREEBOARD - A factor of safety usually expressed in feet above a flood level for purposes of floodplain management. "Freeboard" tends to compensate for the many unknown factors that could contribute to flood heights greater than the height calculated for a selected size flood and floodway conditions, such as wave action, bridge openings, and the hydrological effect of urbanization of the watershed.

GROIN - A dam for sand. A groin is a structure built at right angles to a beach to interrupt longshore sand movement and trap sand in order to stabilize or widen the beach.

100-YEAR FLOODPLAIN - The land area adjoining a river, stream, lake, or ocean which is inundated by the 100-year flood. The 100-year flood is the regulatory (base) flood under the NFIP.

HYDRAULICS - The science dealing with the mechanical properties of liquids which describes the specific pattern and rate of water movement in the environment.

HYDROLOGY - The science of the earth's waters which describes the occurrence, circulation, distribution, chemical, and physical properties of water and its reaction with the environment.

LITTORAL [5] - Of or pertaining to the shore, especially of the sea; coastal.

LITTORAL DRIFT [5] - The movement of sand by littoral (longshore) currents in a direction parallel to the beach along the shore.

MARSH [6] - A wetland dominated by herbaceous or nonwoody plants, often developing in shallow ponds or depressions, river margins, tidal areas, and estuaries.

MANGROVE SWAMP (STAND) [5] - An assemblage of subtropical trees of the genus Rhezaphora forming dense thickets which extend into coastal waters.

NONSTRUCTURAL [2] - Any action taken to reduce or prevent flood losses in a floodplain other than the construction of storage dams, retention dams, diversions, channel improvements, and levees. All those adjustments in floodplain occupancy not specifically intended to modify flood behavior. Such adjustments include such devices as public acquisition of land, relocation of facilities, flood proofing, warning systems, and land use regulation.

PRACTICABLE [2] - Capable of being done within existing constraints. The test of what is pracicable depends upon the situation and includes consideration of the pertinent factors, such as environment, cost, or technology.

PRESERVE [2] - To prevent modification to the natural floodplain environment or to maintain it as closely as possible to its natural state.

REGULAR PROGRAM - The program authorized by the NFIP under which risk premium rates are required for the first part of available coverage (also known as "first layer" coverage) for all new construction and substantial improvements started on or after the effective date of the FIRM, or after December 31, 1974 for FIRM's effective on or before that data. All buildings, the construction of which started before the effective date of the FIRM, or before January 1, 1975 for FIRM's effective before that date, are eligible for first layer coverage at either subsidized rates or risk premium rates, whichever are lower. Regardless of date of construction, risk premium rates are always required for the second layer coverage and such coverage is offered only after FEMA has completed the Flood Insurance Study for the community.

REGULATORY FLOODPLAIN [3] - The area adjoining a river, stream, lake or ocean which is inundated by a regulatory flood. In riverine areas, the floodplain usually consists of a regulatory floodway and regulatory flood fringe (also referred to as a floodway fringe). In coastal areas, the floodplain may consist of a single regulatory floodplain area or a regulatory high-hazard area and a regulatory low-hazard area.

REGULATORY FLOODWAY [3] - A portion of the area a selected flood would occupy consisting of a stream channel and overbank areas calculated to be capable of conveying the selected flood discharge without flood heights or velocities increasing to exceed stated levels. The regulatory floodway is not an actual channel or cement conduit (as the term "floodway" is sometimes understood by engineers). Rather, it is an area (with or without alterations by man) calculated to be of sufficient width and having sufficient flood conveyance characteristics to pass the flood waters from upstream to downstream points without increasing flood heights more than a half foot, 1 foot, etc., or without substantially increasing velocities over what they would have been without assumed confinement. In this calculation, all areas outside of the floodway are assumed to play no role in passing flood flows, and the floodway itself is assumed to remain in an open condition. Floodway areas are subject to frequent high velocity flooding, often at considerable depths.

(REGULATORY) FLOOD FRINGE (also called the floodway fringe) - The portion of the regulatory floodplain beyond the limits of the regulatory floodway. It is subject to less frequent and lower velocity flooding and does not play a major role in passing flood flows.

RESTORE [2] - To re-establish a setting or environment in which the natural functions of the floodplain can again operate.

REVETMENT [5] - Armors the slope face of a dune or bluff with one or more layers of rock (riprap) or concrete.

RIFFLES - Stream channel bottoms are not uniform. They change in repeating patterns between shallow parts called riffles and deeper pools.

RIPRAP - Rock walls.

RISK PREMIUM RATES - See ACTUARIAL RATES.

SEAWALL [5] - A solid barricade built at the water's edge to protect the shore and to prevent inland flooding.

SECOND LAYER COVERAGE - An additional amount of insurance coverage made available when a community officially enters the Regular Program of the NFIP.

SEDIMENT LOAD - The amount of suspended sediment carried by the stream. The stream's sediment load varies with water velocity and sediment size.

SNAGGING - Removal of submerged or partially submerged tree stumps or branches.

STILL WATER STORM HEIGHT - The projected height or elevation of flood waters generated by coastal storms of various magnitudes calculated under ideal still water conditions where no wind generated waves or storm surges are present.

STATE COORDINATING AGENCY [1] - The agency of a State government or other office designated by a State governor or by State statute at the request of the NFIP Administrator to assist in the implementation of the National Flood Insurance Program in that State.

STRUCTURE [1] - For floodplain management purposes; a structure is a walled and roofed building, including mobile homes, and a gas or liquid storage tank that is principally above ground. "Structure" for insurance coverage purposes means a walled and roofed building, other than a gas or liquid storage tank, that is principally above ground and affixed to a permanent site, including mobile homes on foundations. For the latter purpose, the term includes buildings under construction, alteration, or repair, but does not include building materials or supplies intended for use in such construction, alteration, or repair, unless such materials or supplies are within an enclosed building on the premises.

STRUCTURAL - See FLOOD CONTROL WORKS

SUBSIDIZED RATES [1] - The rates established by the NFIP Administrator involving in the aggregate a subsidization by the Federal Government.

SUBSTANTIAL IMPROVEMENT [1] - Any repair, reconstruction, or improvement of a structure, the cost of which equals or exceeds 50 percent of the market value of the structure either, (a) before the improvement or repair is started, or (b) if the structure has been damaged, and is being restored, before the damage occurred. For the purposes of this definition, "substantial improvement" is considered to occur when the first alteration of any wall, ceiling, floor, or other structural part of the building commences, whether or not that alteration affects the external dimensions of the structure. The term does not, however, include either (1) any project for improving a structure to comply with existing State or local health, sanitary, or safety code specifications that are solely necessary to assure safe living conditions or (2) any alteration of a structure listed on the National Register of Historic Places or a State Inventory of Historic Places.

SWALE [5] - A low-lying area frequently moist or marshy; an intermittent drainageway; a slough.

SWAMPS [6] - A wetland dominated by woody plants, shrubs, and trees such as maples, gums, and cyprus.

TSUNAMI [5] - A great sea wave produced by submarine earth movement or volcanic eruption.

VARIANCE [1] - A grant of relief by a community from the terms of a floodplain management regulation.

WATER SURFACE ELEVATION [1] - The projected heights in relation to Mean Sea Level reached by floods of various magnitudes and frequencies in the floodplains of coastal or riverine areas.

WATERSHED [4] - A region or area contributing untimately to the water supply of a particular watercourse or water body.

WETLANDS [2] - Those areas that an inundated by surface or ground water with a frequency sufficient to support and, under normal circumstances, does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include bottomland hardwoods, swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds.

COMMON ABBREVIATIONS

DR&R - Office of Disaster Response and Recovery of FEMA

FEMA - Federal Emergency Management Agency

FHBM - Flood Hazard Boundary Map

FIA - Federal Insurance Administration of FEMA

FIS - Flood Insurance Study

FIRM - Flood Insurance Rate Map

NFIP - National Flood Insurance Program

REFERENCES

1. As defined in the regulations for the National Flood Insurance Program, 41 FR 46962, 1976.

2. A defined in the U.S. Water Resources Council guidelines for implementing Executive Order No. 11988, 43 FR 6030 (1978).

3. From J. Kusler and T. Lee, "Regulations for Flood Plains," American Society of Planning Officials, Planning Advisory Service Report No. 277 (1972).

4. From Wisconsin Administrative Code, Chapter NR 16 (July 1977).

5. From John Clark, *Coastal Ecosystems Management: A Technical Manual for the Conservation of Coastal Zone Resources* (New York: John Wiley and Sons Interscience, 1977).

6. As defined in Elinor Lander Horwitz, *Our Nation's Wetlands* (Washington, D.C.: Government Printing Office, 1978).

APPENDIX B

PUBLIC PARTICIPATION TOOLS

PUBLIC PARTICIPATION TOOLS

Education/Information	Review/Reaction	Interaction/ Dialogue
Newspaper Articles	Public Hearings	Workshops
Radio and TV Programs	Survey Questionnaires	Special Task Forces
Speeches and Presentatons	Public Inquiries	Interviews
Field Trips	Public Meetings	Advisory Boards
Exhibits		Informal Contacts
School Programs		Study Group Discussions
Films		Seminars
Brochures		
Newsletters		
Reports		
Letters		
Conferences		

EDUCATION/INFORMATION MECHANISMS

The educational tools designed to promote the quality of public understanding of issues must deal with the informational needs of both the most and the least sophisticated interest groups in your community. These tools will be used to:

- familiarize the public with the nature of the flooding problem being addressed in the design of a flood hazard management program;
- apprise the public of key issues that may be of community concern;
- Apprise the public of opportunities for input into key issues; and
- provide detailed information in lay language on the technical and political aspects of flood hazard management.

The use of informational tools will be essential to the conduct of any public participation program -- whether conducted by a local government entity or by a citizen organization. These informational mechanisms cannot be the end of the public participation program, however. Meaningful public involvement will require the use of reactive and interactive mechanisms as well.

MAILING LISTS

The development of a comprehensive mailing list of all organizations and individuals likely to be interested in or affected by a flood hazard management program should be one of the first steps in a public participation program. The list should include public officials, business and civic groups, public interest and environmental organizations, and representatives from outside the planning area such as upstream and downstream residents who may have an interest in the program. The list should be supplemented throughout the planning process as more people become aware of the program, attend meetings, and ask for information. The mailing list will be useful for distributing newsletters, fact sheets and other information materials and meeting and hearing announcements, and for conducting surveys or widespread public consultation activities. Citizen groups should be involved in developing such a mailing list, both for themselves and for the use of governmental agencies with pubic participation responsibility.

NEWS MEDIA

Newspapers, local magazines, and radio and television stations reach the general public and help to stimulate interest in the program. They should be kept informed of all items of general interest. Key issues should be clarified and made interesting to news editors and environmental reporters through news briefings and special media events, such as a visit to a flood hazard area (particularly if there is evidence of damage).

Except when used to support in-depth feature stories, the background material prepared for news items should be brief and non-technical. When technical or complicated information is to be included in an interview or media event, it should always be concisely stated in a fact sheet and included with a brochure and/or background materials in a press kit. Press kits should be prepared for all events that you hope will be covered by the media.

In order to use the media effectively you should consider undertaking the following activities, early in the program development process.

- Visit media offices at the beginning of the process.
    - -- identify key personnel responsible for covering stories that might be related to the program.
    - -- learn media requirements for stories -- deadlines, filming requirements, requirements for public announcements.
- Hold background briefing for media personnel identified. Learn from media personnnel what kinds of issues are likely to receive media attention.
- Develop a media plan which will anticipate media coverage for various aspects and stages of the planning process. The plan should include:

-- news releases about specific aspects of the planning process, such as hearings, appointment of advisory groups, and workshops. In order to ensure arrival at the appropriate desk, these should always be hand delivered.

-- public service announcements (PSA's) for radio and television stations to publicize meetings and hearings or to call attention to some aspect of the plan, such as selection of alternatives. Radio stations will usually prepare PSA's from written copy sent to them. Television stations may request someone to appear in the PSA, or they may want to film on location. It is always best to handle these arrangements in person.

-- participation in radio and television talk shows. Make sure the individuals who appear are able to respond to a wide range of questions in an informative and congenial manner.

PUBLICATIONS

Publications may consist of such things as published versions of draft components of the proposed management program, draft and final Environmental Impact Statements, (if applicable) or of a variety of short brochures, flyers, fact sheets or bulletins designed to facilitate public input to the Flood Hazard Management Plan. These publications may be stored in depositories, handed out at meetings, enclosed with mailings, and supplied to the media.

- Flyers: A flyer should be very brief -- one or two pages, perhaps include a picture or two. It might explain the purpose of the management program and give the name, address, and phone number of the public official in charge of the planning.

- Brochures: A brochure is a brief booklet which may, for example, describe the need for the program, refer to federal and state laws and regulations, detail various steps in the planning process, and provide background information for new advisory committee members, government officials, newsmen, and other interested persons. A summary of the draft management plan might be distributed as a brochure, prior to any final pubic meeting.

- Fact Sheets: Probably one of the most useful publications will be the fact sheets, each on a single issue of concern in the program, such as community costs associated with continued flooding, hazard protection value of critical natural resources, alternative management strategies, etc. Fact sheets might also be used to outline the consequences of alternative approaches and draw upon the experience of other communities where appropriate.

- Technical Bulletins: It might prove advisable to prepare one or more detailed publications about the technical aspects of the program, such as determination of floodway and floodplain boundaries, and distribute these to advisory committee members and other specialized interests.

Individuals responsible for developing publications will want to be aware of the many publications already developed by FEMA, by the state agency, and by others (such as those developed for The Conservation Foundation's training program). Preparation of publications can be costly. Use should be made of existing general materials whenever possible, with new publications focusing on the specific community situation. The FEMA Regional Office may be able to help locate appropriate materials.

NEWSLETTERS

A newsletter should be published at regular intervals and mailed to persons and organizations on the mailing list (or on a list compiled by community leaders). For maximum utilization, the newsletter might be designed as a slip sheet that can be distributed with organizational mailings.

A newsletter is usually started early in the planning stages and continued throughout the planning process. It is an excellent way of reporting a variety of news to those either interested in or whom may become interested in the Flood Hazard Management planning.

Some of the types of articles and information appropriate to newsletters include: general water resource and flood hazard management news; feature articles explaining alternative programs; summaries of relevant workshops and meetings, hearings, meetings and workshop notices; reports or recommendations of a citizens advisory committee; and letters to the editor.

INFORMATION DEPOSITORIES

The local governmental agency might find it useful to maintain a central information file or depository which includes significant program planning documents (such as relevant maps, proposed ordinances, etc.). Ideally, these depositories should:

- be in buildings (such as libraries) whose hours openly facilitate community use;

- have copying machines on the premises;
- in larger communities be in a number of locations;
- for more complex projects have staff support (perhaps volunteer) to assist any search for materials.

SPEECHES

A number of forums can be selected for speeches and audio-visual presentations on the flood hazard management program. Appropriate forums include service clubs, regular meetings of civic groups, churches, environmental organizations, chambers of commerce, and educational institutions. A speakers' bureau including authorities on several aspects of the planning process should be organized. The local official, Planning Commissioners, members of his technical staff, advisory committee members, and other community leaders knowledgeable about the planning should be invited to participate.

Speakers should possess effective speaking ability and be able to tailor their remarks to the interests of the groups to be addressed. Presentations should be prepared on a variety of topics, and then be used as a basis for individual talks. Handouts, slide shows, and exhibits will assist in making a speaker's presentation more interesting and understandable.

EXHIBITS

Exhibits are visual displays which may be as simple as maps, charts, and diagrams or as sophisticated as a walk-through maze which allows the participant to make alternative selections regarding the future growth and character of his community. Simple exhibits may be used in conjunction with public meetings, hearings, speeches, or seminars. More sophisticated displays may be stationed in public buildings or shopping malls where they can reach large numbers of people. Large exhibits should be designed to both provide information and receive public input. They are best managed if constructed so they do not require an attendant.

REACTIVE/INTERACTIVE/DIALOGUE MECHANISMS

Most of the mechanisms described below can be considered reactive or interactive depending on how the information obtained will be used: Will the mechanism be used simply to obtain public response to an agency decision (reactive) or also to allow an agency to respond to considerations posed by the public (interactive)?

Functional two-way communication can help keep officials in constant touch with the needs and expectations of the public. Basic organizational and administrative techniques, such as those discussed below, can provide the framework for public involvement.

CONSULTATIONS

The word consultation means the act of seeking advice and exchanging views. A variety of formal and informal mechanisms can be utilized to fulfill the consultation requirements of public participation regulations. Some of these mechanisms are:

INFORMAL CONSULTATIONS

Face-to-face interviews or conferences, are useful both for transmitting information and for receiving public input. Consultations will be needed throughout the planning process, but particularly in its early stages. Interested citizens and organizations should initiate discussions with governmental decision makers when they have information to offer, or issues to be resolved.

Consultations initiated by citizen organizations often will be most useful if arranged on an ad hoc basis covering specific issues of concern to that organization. Such activities will often be particularly well-received by a governmental agency when they involve a number of different organizations representing a variety of interests. On the other hand, effective advocacy of a particular position may require that the organizations requesting the consultation come from similar interests.

TASK FORCES

A task force is usually a small group of people, including some with special expertise, which is assigned to research or resolve a specific problem in a limited time frame. Task forces may look at problems which are generally outside the scope of a typical local land use planning process, such as potential increase in a community's future flooding problems resulting from upstream development.

Frequently the work of a task force will require some understanding of technical issues relating to flood hazard management. With appropriate assistance from staff involved in the local planning efforts, citizens' organizations are often able to study problems and arrive at creative solutions that might not otherwise be considered to be politically acceptable.

The problem to be considered by a task force should be clearly defined before its members commence work. A work schedule should be prepared, and a fair cross-section of knowledgeable persons representative of a range of viewpoints should be selected to serve. Task force members should be furnished with sufficient background information to enable them to thoroughly understand the problem at hand and to deal with it in a short period of time. One person (either on the task force or serving as staff to the task force) should be appointed to formally summarize the results, including any missing data or unresolved issues.

WORKSHOPS

A workshop is a small group meeting at which all participants have some familiarity with the topic to be discussed and are afforded the opportunity to comment in considerable detail. Such meetings are particularly useful in the middle stages of the planning process when the basic facts are known, but the alternative proposals have yet to be thoroughly examined. Workshops require substantial preparation time to be successful, but offer one of the most useful ways to explore in depth what people think about the ramifications of the flood hazard management program.

In order to ensure a successful workshop, the organizer should undertake the following preparations:

- succinct definition of the objectives of the workshop. What are participants expected to accomplish;
- preparation or identification of materials to be distributed to participants before the workshop that will facilitate discussion during the workshop;
- a briefing of speakers and resource people on what their roles are to be and what information they will present;
- attention to the administrative details of the workshop to minimize confusion and maximize the

comfort of participants (i.e., Will the workshop take place over a meal time? Will meals be provided? If not, where can participants go to quickly grab a bite to eat?, etc.)

SURVEYS

Several kinds of surveys can be used in planning for flood hazard management. A technical survey might be designed to elicit information from those with technical knowledge (such as local and/or state agencies) to provide data on how much they spend each year on flood disaster related projects. A general survey designed to gauge public opinion and pinpoint community values and goals might be circulated before selection of alternatives in order to determine public response to such alternatives as acquisition and relocation of flood prone properties. Or residents might be asked to respond to questions regarding the extent of past flooding damages, amount of flood insurance claims, etc.

Data collection through surveys can be very useful. In the Buffalo, New York Water Quality Management Plan for example, a survey revealed a depth of public support for improved water quality that led to stronger implementation recommendations than the decision makers would have otherwise supported.

Surveys can also be expensive and time consuming. Those planning to conduct a survey should consider using academic resources as a source of volunteer assistance. For example, university students may be available to help in the preparation of a survey including pre-testing that survey. High school classes, or scouting groups might be willing to help distribute a survey and compile resulting data.

CITIZEN ADVISORY COMMITTEE

A formally constituted Citizens' Advisory Committee (CAC) has the potential for serving as an institutionalized consultation mechanism with the ability to provide continuous input to each stage of the planning process. If properly balanced and adequately staffed (representing a broad base of community interests), a CAC may ensure that important knowledgeable interests in the community will have continuing input into the planning process.

Citizens' advisory committees have been utilized in various environmental programs throughout the years, and they have been the subject of considerable well-founded criticisms. The criticisms leveled at CAC's have basically fallen into the following three categories.

- Their membership is often dominated by int an economic stake in the issues under cons While CAC's may be designed as a means for and institutionalizing the input of those access to the decision-making process, the do not achieve those goals.

- A CAC may become a barrier to public parti if it is viewed by the sponsoring agency a public participation program. If the loca only consults with the CAC, then the decis simply receives the thoughts of another gr who may or may not represent the general p

- A CAC may be ineffective if their role is fined, or staff support is inadequate, reg whether or not it is appropriately constit

Citizen organizations should be careful not t promote a CAC as a key activity of a public partic program. If CAC's are selected as a public partic method, be sure to give equal attention to the mak committee, functions of the committee, and its sta

A number of questions will have to be careful within the community as the advisory committee is mulated.

- membership (what economic interests are re What types of local government officials, interest representatives?)

- size (will the advisory committee have 10 30 members?)

- role and responsibilities (will the adviso have some responsibility for the executior public involvement program? To what degre advisory committee periodically expand its through ad hoc task forces?)

The CAC should be appointed in the early stag planning process. It will establish a necessary c link between the local officials and the public; p valuable forum for reconciling varying viewpoints; review and make recommendations; and reflect commu and goals during the planning stages. The CAC may in the development of a public participation workp on politics, and participate in public meetings, w and seminars.

It is important that the committee's role be established early in the planning-process. To be fully effective, the committee must have direct input into all major decisions affecting the plan. Their value will be greatly reduced if they become only a reactive panel. If possible, all CAC activities should be funded, and adequate staffing should be provided.

PUBLIC MEETINGS

Public meetings afford an opportunity to introduce and stimulate interest in flood hazard management planning. They also afford the chance to clarify issues and give concerned citizens a forum in which to present their questions and air varying points of view.

Meetings should be scheduled throughout the planning process to provide information as well as receive citizen's opinions. They provide a valuable opportunity to explore the environmental, social, economic, legal, and political ramifications of various alternatives considered during the planning stages.

These meetings can take a variety of forms, for example:

- meetings designed to accomplish a task;
- meetings designed to identify and negotiate conflicts;
- open forums simply intended to air a variety of viewpoints; and
- large mass meetings to present basic information.

Public meetings also may be sponsored in different institutional frameworks. For example:

- the Citizens Advisory Committee may hold a working public meeting designed to broaden input from other publics on specific issues;
- the local officials may hire the local chapter of the League of Women Voters to sponsor an open forum on specific issues;
- an already scheduled town meeting may focus its attention on flood hazard management issues needing resolution.

CAC's should normally play a role in formal public meetings so that they can receive input from the public and effectively advocate legitimate public interest.

CHARETTES

One of the more sophisticated and creative consultative mechanisms, charette is an intensive brainstorming session in which a number of people representing different interests get together to define problems and come up with solutions. It may last anywhere from a couple of hours to a few days, and participants are given no breaks. In its manual, Citizen Participation Techniques, the Institute for Participatory Planning (Laramie, Wyoming) list the following characteristics of a successful charette:

- problems can serve as a catalyst to focus peoples' attention and facilitate discussion;
- there should be large and small meeting rooms if more than a few people are involved. Most of the work will be done in small groups;
- all kinds of materials should be available, particularly roles of paper and magic markers;
- all food should be brought in. Some breaks for "cat naps" should be made available;
- planners, environmental specialists and other technicians should be sprinkled among the lay people to facilitate meaningful discussion.

TRAINING MECHANISMS

Three of the most common training mechanisms are:

Seminars -- as described here are essentially training exercises designed to assist a small group in understanding the importance of community flood hazard management and the components to be considered in developing a truly comprehensive program. The seminars may be repeated several times with different audiences and may be planned by concerned citizens or by local government. The purpose of the seminar is to convey necessary information early in the planning stages, so that citizens who will continue to be involved will be knowledgeable about the issues and able to participate more effectively. Seminars or training sessions should be held by the local government official for advisory committee members, task forces local government staff, and others active in the planning process.

Conferences -- involve the presentation of information to a medium to large audience in a manner that facilitates the group's understanding of issues that need resolution. Conferences may combine techniques common to public meetings, workshops and seminars. The key ingredient, however, is a formal learning experience that will assist audience participants in understanding the issues that must be resolved before decisions can be made.

Simulation and Games -- one of the most sophisticated public involvement mechanisms is the simulation of actual planning situations as a technique for mediating conflict and for training citizen participants and planners with differing points of view.

A central goal of many public participation programs is to create forums for the development of a consensus on the best solution to the community's flooding problems. Creating a consensus for whatever solution emerges from the planning process requires a highly complex interplay of political forces. Sometimes it is possible to stimulate these interactions in a less-charged atmosphere by developing a "let's pretend" situation which has been highly simplified to permit acting out the interplay of forces.

The simulation will often require the hiring of a specialist to develop the game and conduct the activities.

BUILDING A COALITION

One of the most effective ways citizen organizations can utilize the mechanisms described above is to build a broad-based coalition within their community to affect the decision-making process. An organization's various efforts to affect the decision-making process will be viewed more favorably by the general public and by the local government grantee if it is evident that a broad-base of community support is involved.

Whether you decide to hold a workshop or seminar or to establish a task force, you will wish to consider expanding the number of organizations and individuals involved in such an activity. Building such a coalition will involve informal meetings with a number of different interests in order to establish common points of concern.

Building a coalition may not mean that all organizations agree with all or even most of the possible positions vis-a-vis flood hazard management. It may simply mean that the organizations forming the coalition agree to disagree on certain issues, have identified certain issues they have in common, and share the objective to regularly communicate with the decision-making body.

PUBLIC HEARINGS

Public hearings are normally a reactive mechanism and are meant to give individuals and organizations a formal opportunity to express their opinions on an issue immediately prior to decision-making. Although in theory most public hearings are scheduled just before decision-making, in reality they usually take place after the staff has completed its work and has arrived at a tentative conclusion. All too often the burden is on the public to prove that a different conclusion is warranted.

Public hearings have been criticized not only because of the heavy burden of proof on the public to change an agency course, but also because the manner in which they are handled often discourages rather than encourages citizen input.

Officials responsible for public hearings may wish to consider holding one earlier in the decision-making process than is requierd by regulation. This approach would give officials the opportunity to better consider and respond to public input before finalizing recommendations.

USING EXISTING INSTITUTIONS FOR PUBLIC INVOLVEMENT

In addition to the tools for public involvement in the flood hazard management planning process discussed in preceding sections, there will be a number of opportunities for affecting final plans outside the formal planning process. We cannot hope to describe the range of opportunities available because they will vary enormously depending upon the institutional structure of your community and your community's relationship to other state and regional governments.

In constructing a public participation program, you should examine the various governmental and non-governmental tools for decision-making that exist in your community and tailor your program to make maximum use of these tools.

TOWN MEETINGS

New England towns and villages annually hold town meetings in the spring to approve the yearly budget and specific actions or programs to be undertaken by the Town Council or Board of Selectmen. The town meeting might be used to gain approval for local expenditures to acquire and relocate flood-prone properties or decisions to otherwise regulate development in flood hazard areas. In many New England towns, the ordinances required to implement the NFIP must be brought before the town meeting.

Citizens who wish to be involved in flood hazard management planning will wish to participate in all town meetings in which relevant issues are on the agenda. In addition, if flood hazard management is not on the agenda, local decision-makers might be responsive to requests that it be added. A New England town meeting may offer a unique opportunity to reach a broader constituency in the community than is possible at other times.

CONSERVATION COMMISSIONS

Conservation Commissions, like town meetings, are unique to the northeast and may significantly influence flood hazard management planning. Commissioners have the authority to review land use management proposals and environmental impact statements (if an EIS is prepared) and to assess the natural resource implications of the proposed program. They will probably also have a wealth of data available to assist citizens in making their own determinations regarding the environmental impact of a proposed program.

PLANNING BOARDS AND COMMISSIONS

Many communities will have some type of planning and/or zoning board or commission to develop and/or approve economic development plans, land use plans, or individual requests for zoning. These agencies should be integrally involved if not solely responsible for developing a community flood hazard management program or at least determining whether or not the proposed program is consistent with other local plans.

Planning boards and commissions frequently have regular meetings which are open to citizens. In such meetings, citizens may raise questions about the implications of certain aspects of the Flood Hazard Management Program.

Such boards and commissions may not have much power or authority in a community. Concerned citizens, however, can exert considerable influence to insure better coordination between the Planning Commission and those planning for flood hazard management, thus ensuring these programs are more responsive to broader planning concerns.

REGIONAL PLANNING AGENCIES

Most areas of the country now have regional planning agencies of some kind. These agencies will have the responsibility for conducting an initial review (known as A-95 Review) of FIA flood insurance studies, state and local floodplain management regulations, and any proposed federal program or activities which may impact floodplains to assure consistency with other local and regional plans and to assess environmental impacts. The A-95 Review Process provides regional planning agencies with the opportunity to review and comment on a local floodplain management program from a regional perspective, but the recommendations generally are not legally binding.

CABLE TELEVISION

In a number of communities around the country, local cable TV stations have sponsored regular public-service programs produced in the community and dealing with issues of special local interest and concern. Local groups could develop programs focusing on the flood hazard management planning process and, for instance, discuss the local and regional flooding problems being addressed and present controversial issues.

Several communities are experimenting with the use of a two-way capability that will allow cable TV viewers to transmit back to local stations, offering a feed-back opportunity not normally associated with television. In flood hazard management planning areas with a scattered rural population, this two-way capability may significantly add to the usefulness of a public meeting if it is transmitted on TV.

The two-way capability of cable TV is still in the experimental stage, and may not be widely available to you. Locally originated public service programming, however, is not at all experimental, and may be a useful mechanism to foster broader public involvement in flood hazard management.

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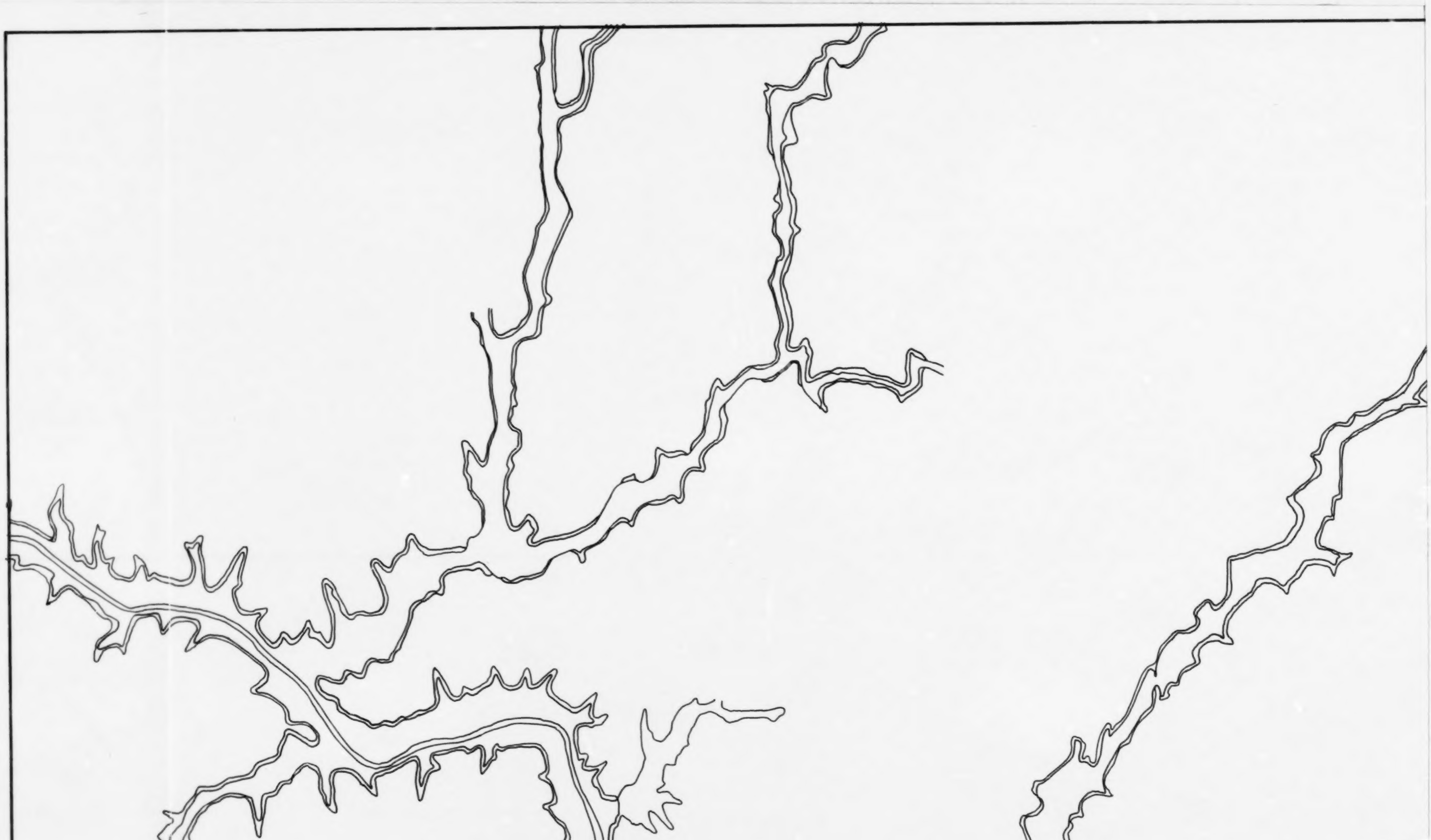

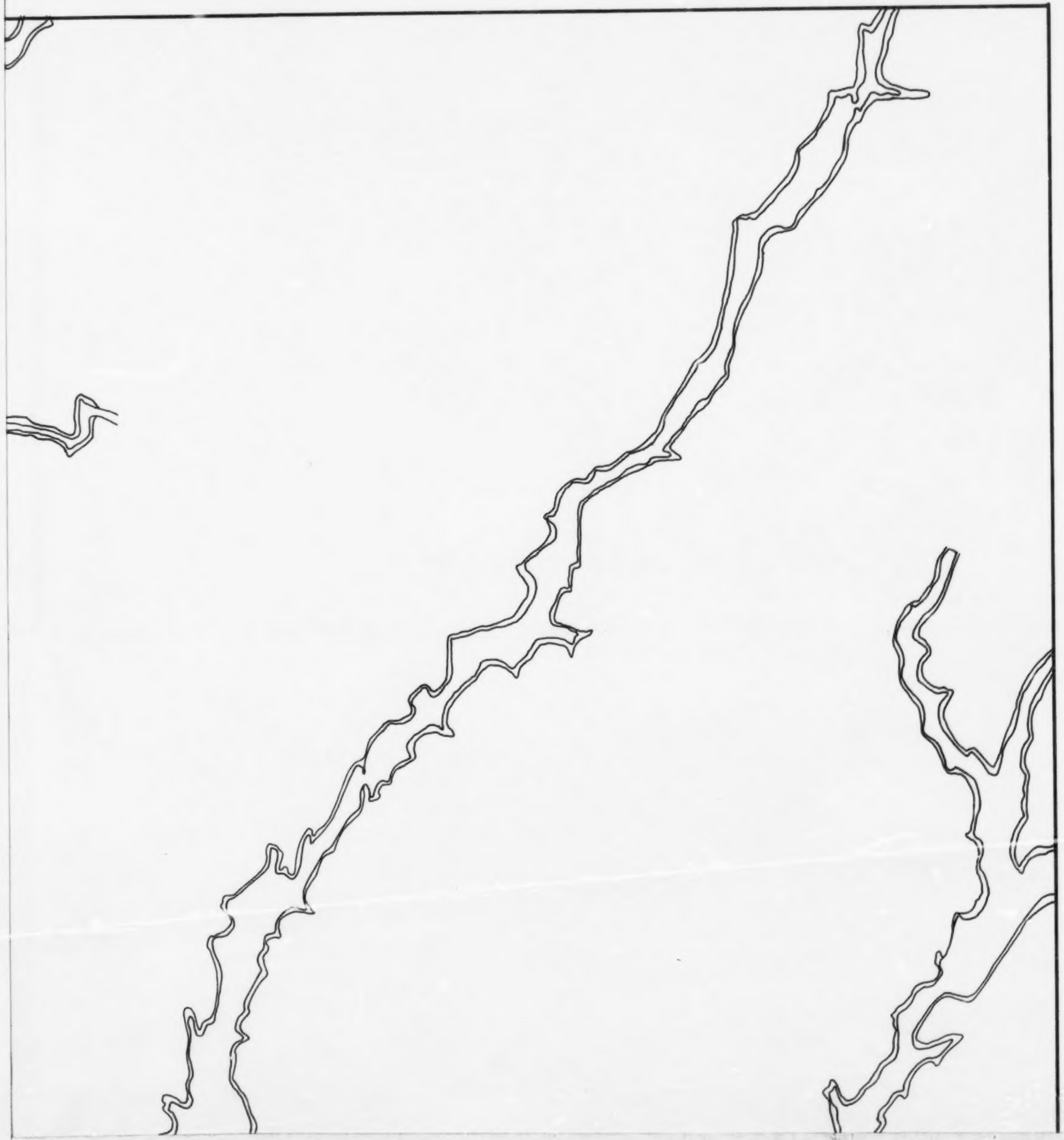

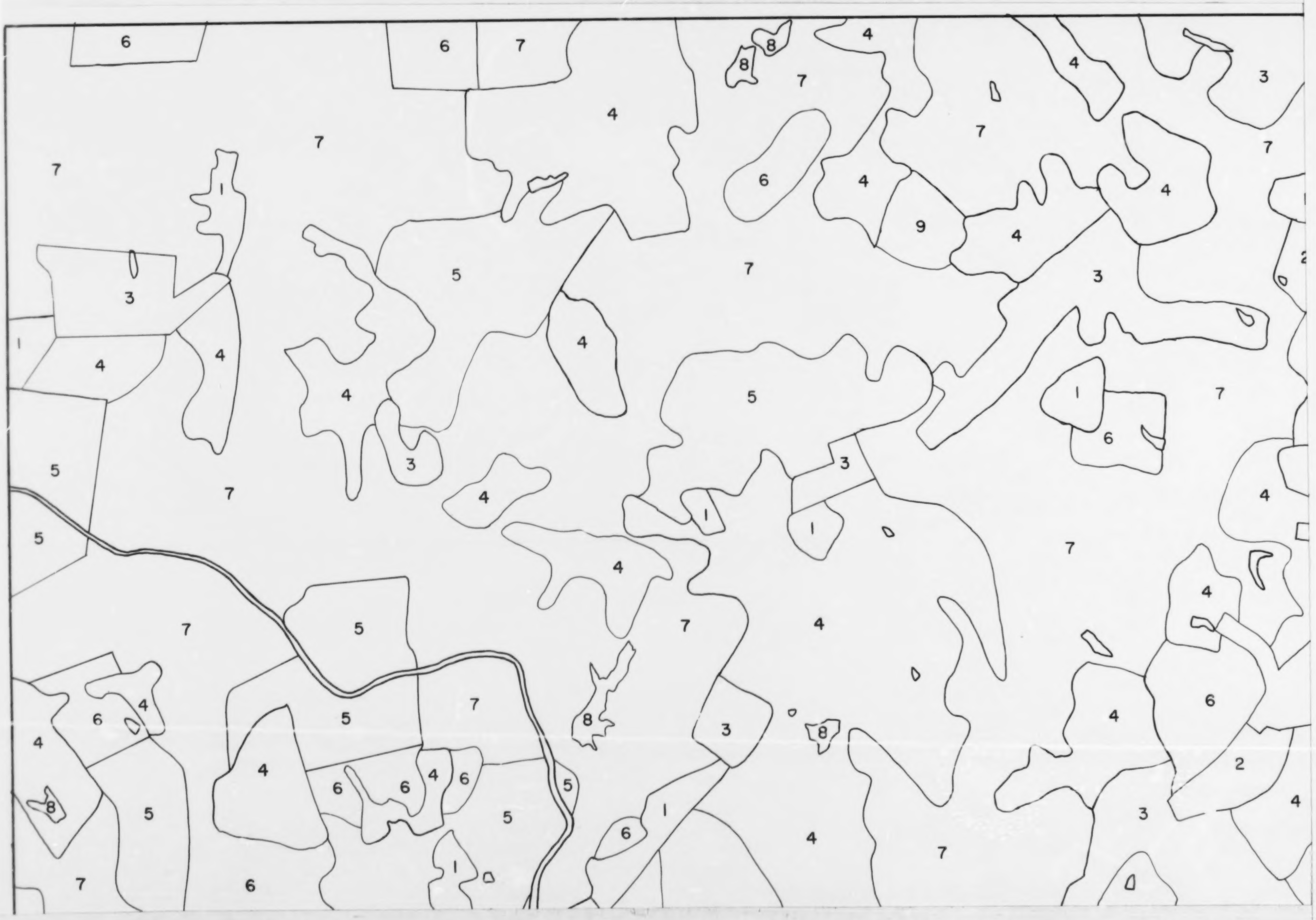
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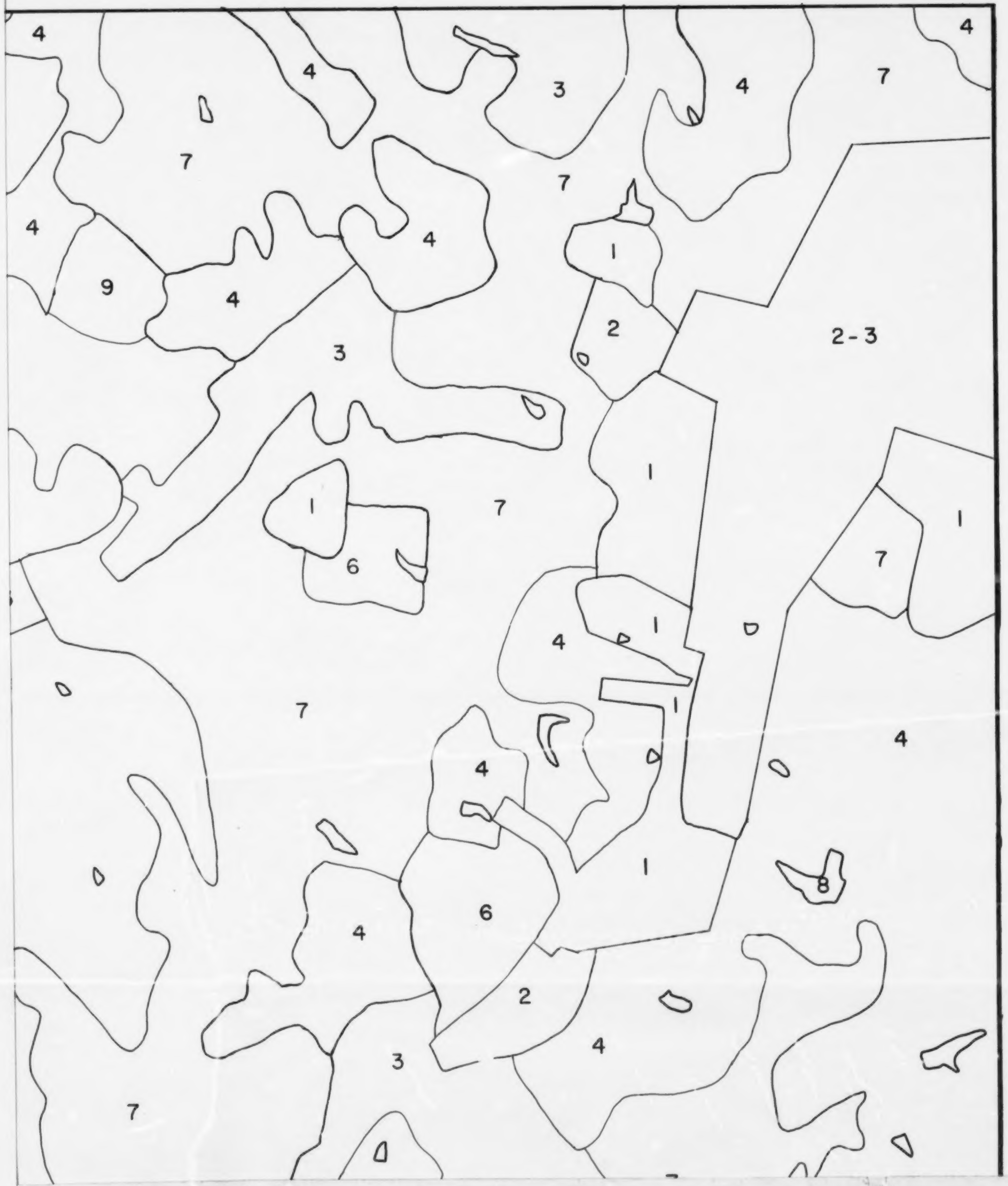
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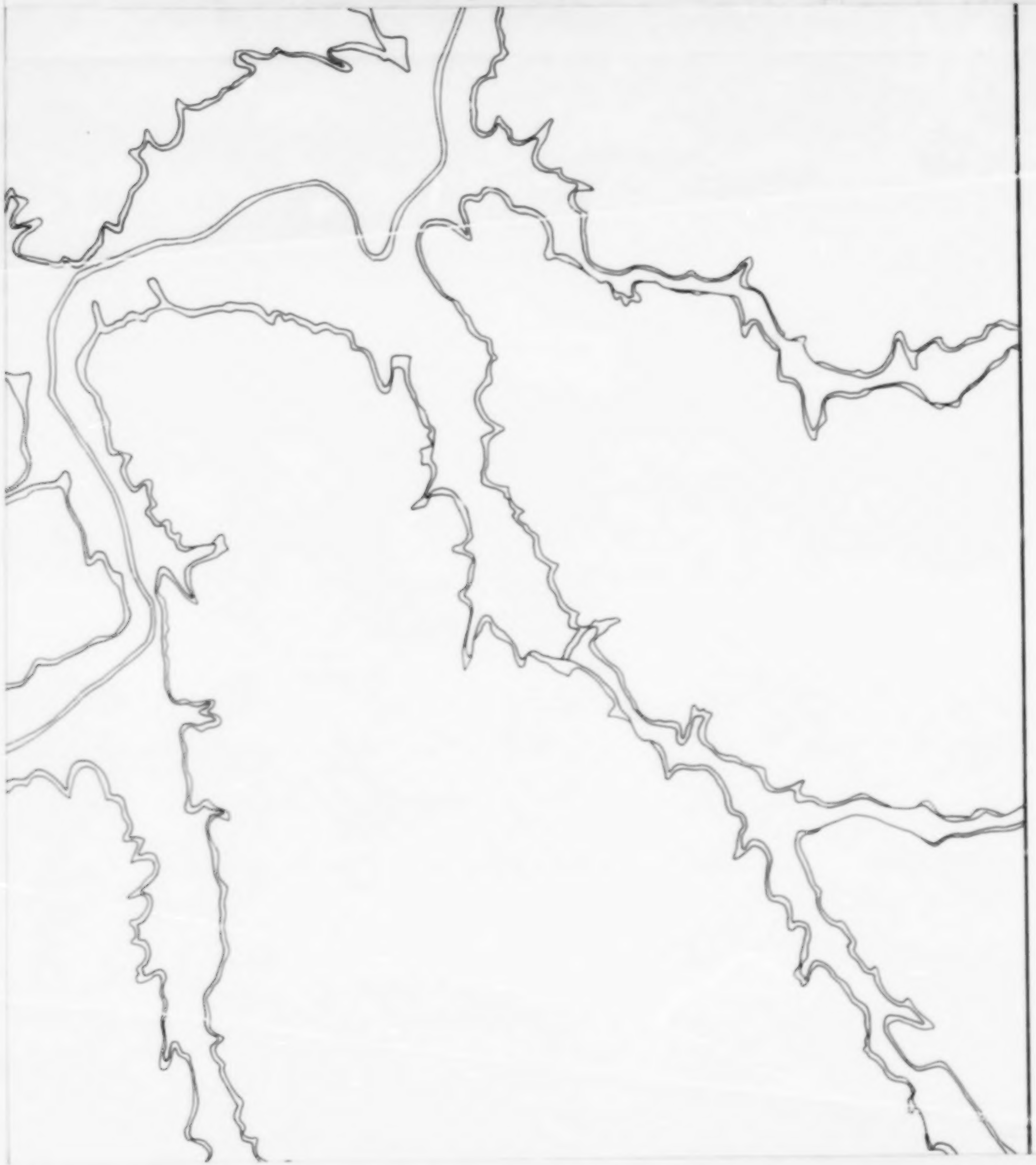

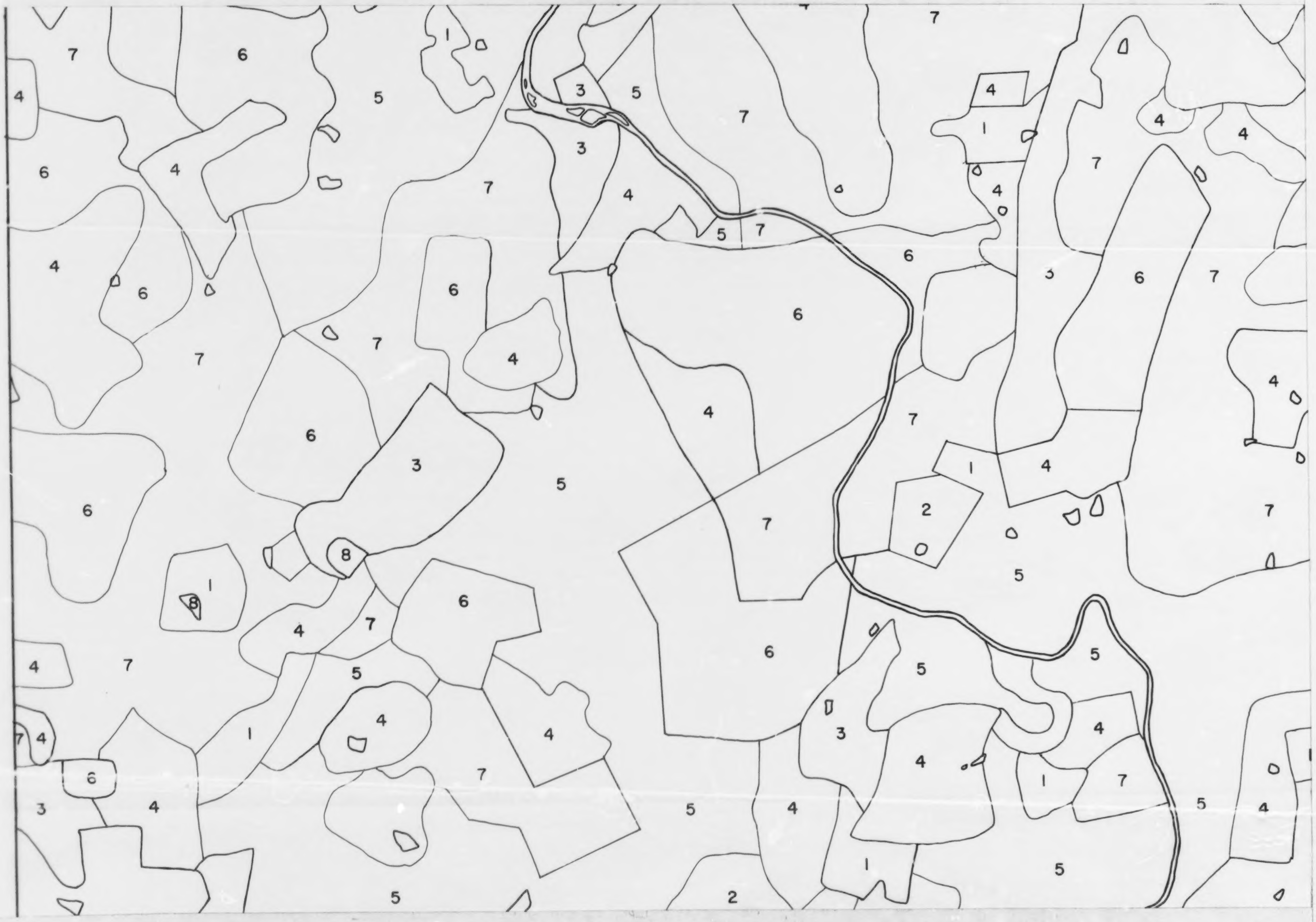
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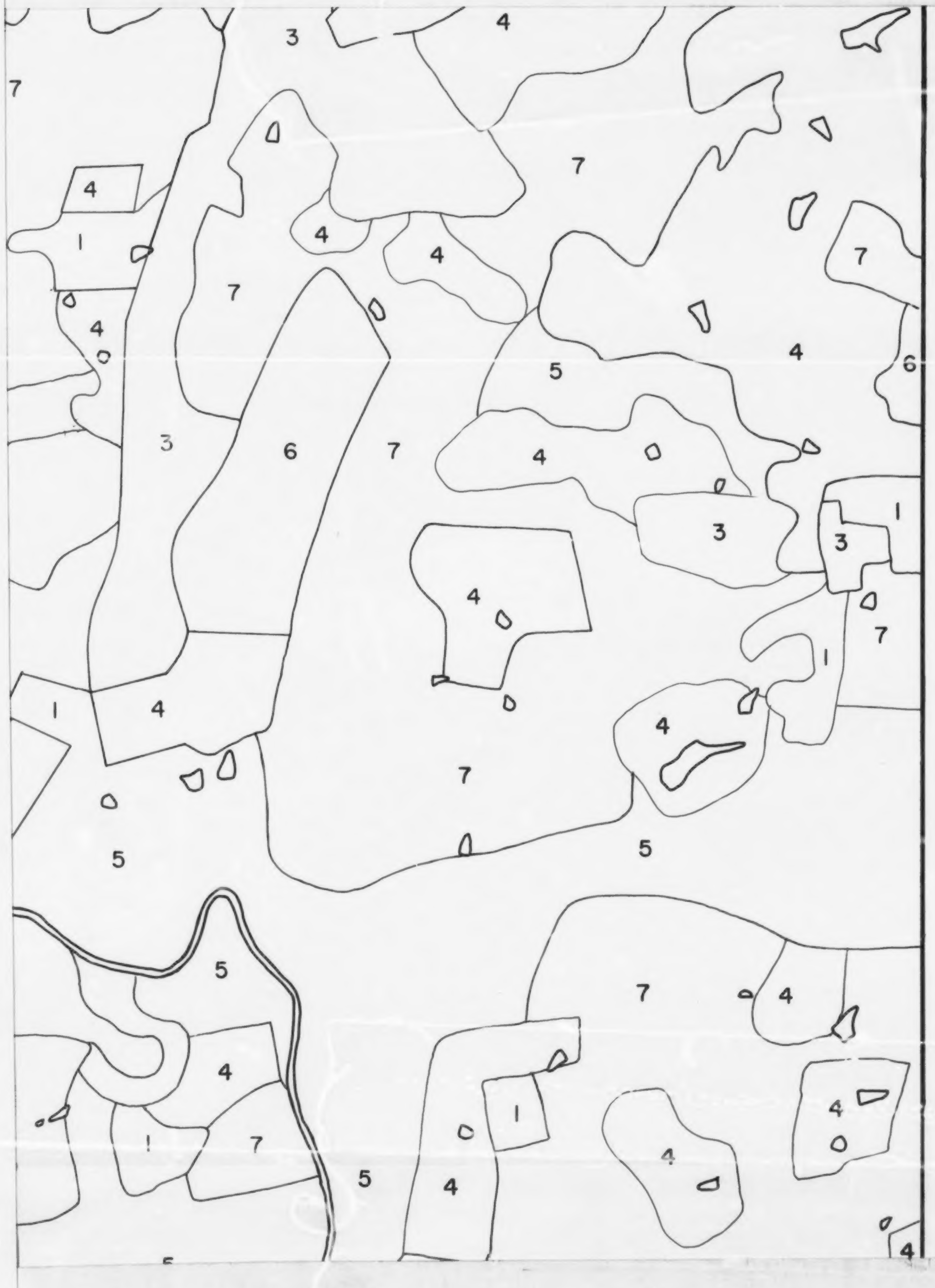
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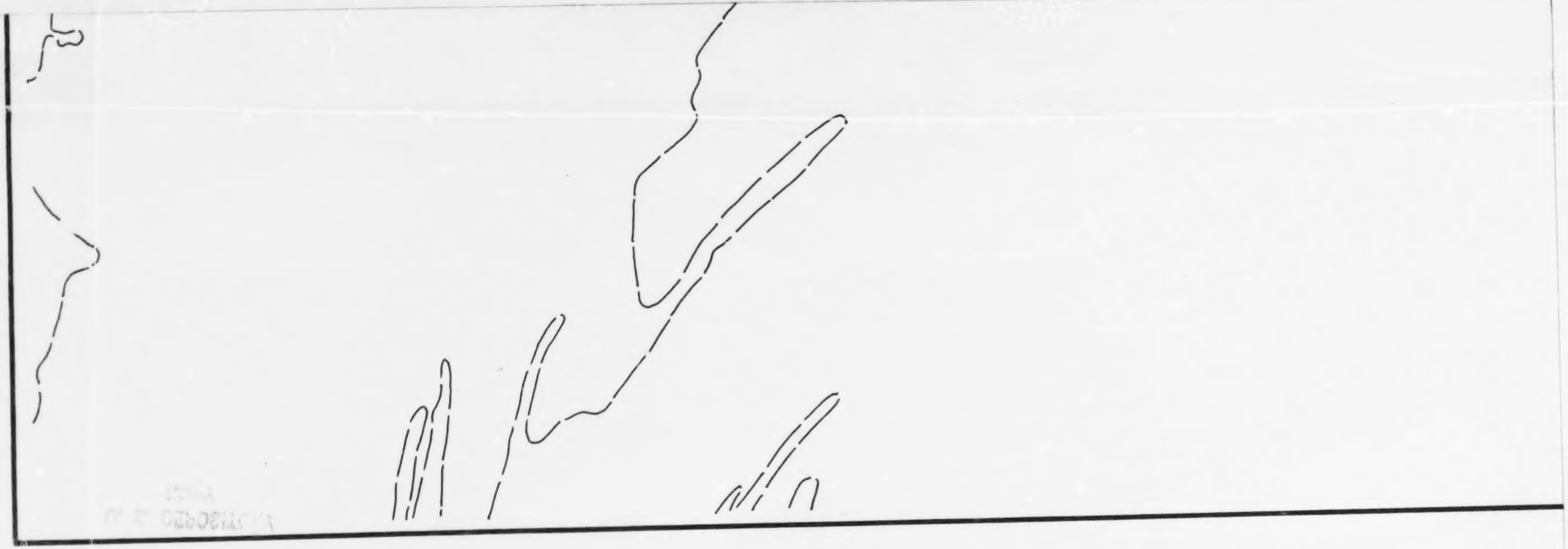
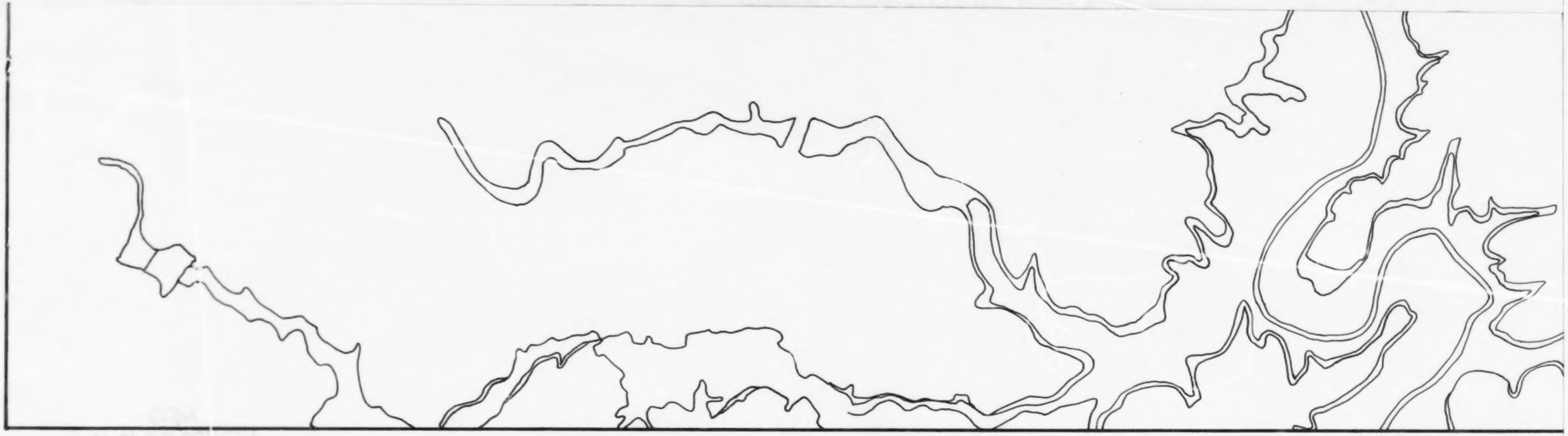


flood hazards boundaries

City of Georgetown



FLOOD BOUNDARIES

Adapted From FIA Flood Insurance Rate Maps

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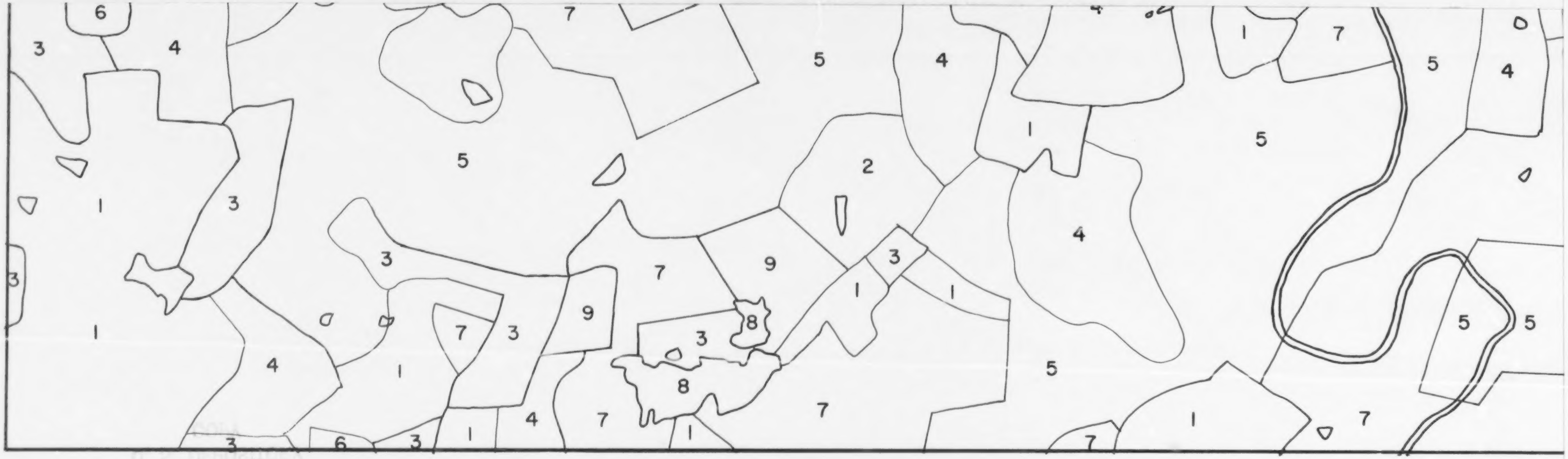
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LAND USE & LAND COVER

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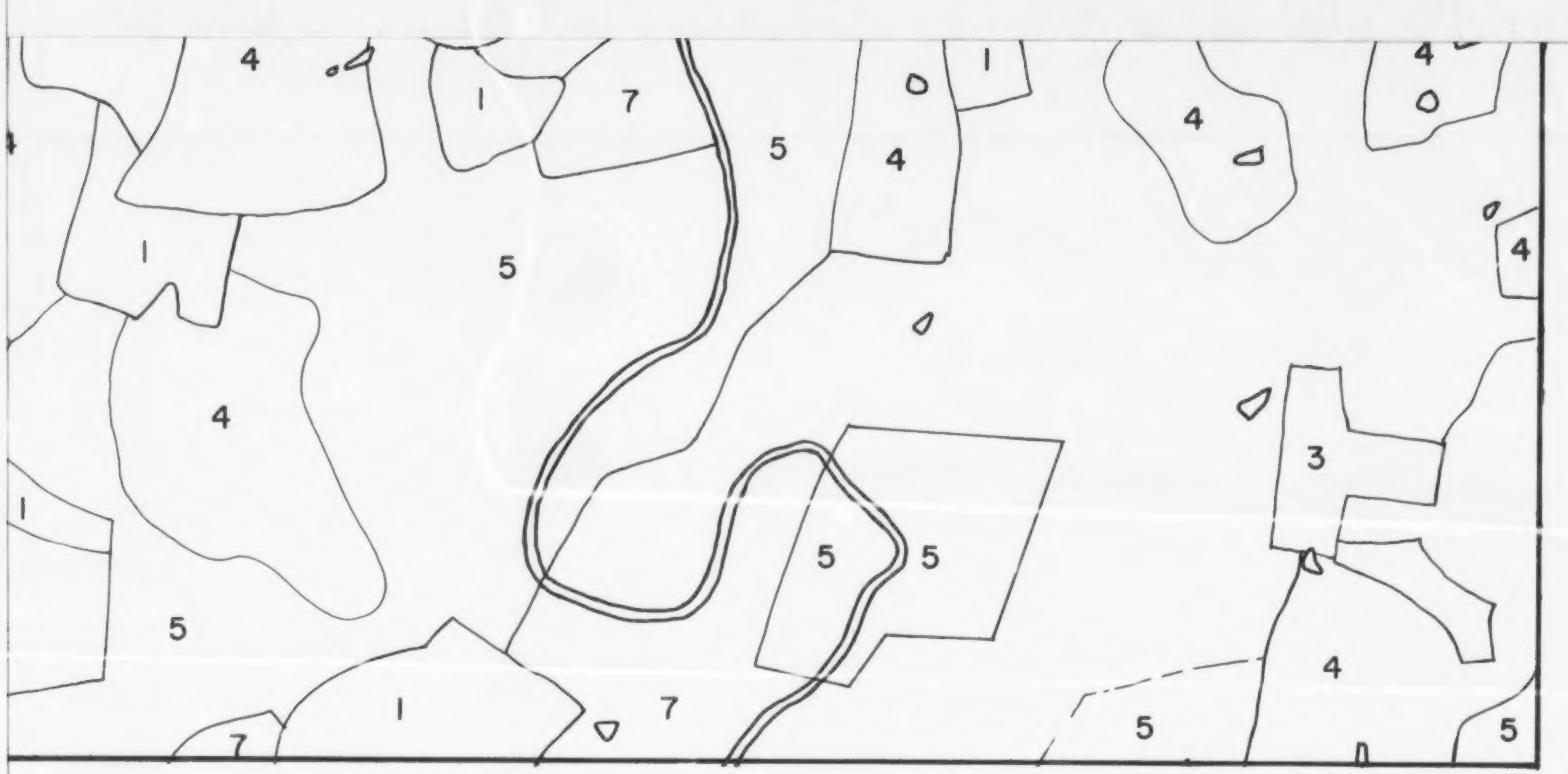
3- Mixed Urban
4- Agriculture
5- Deciduous Forest
6- Evergreen Forest
7- Mixed Forest
8- Water
9- Barren Land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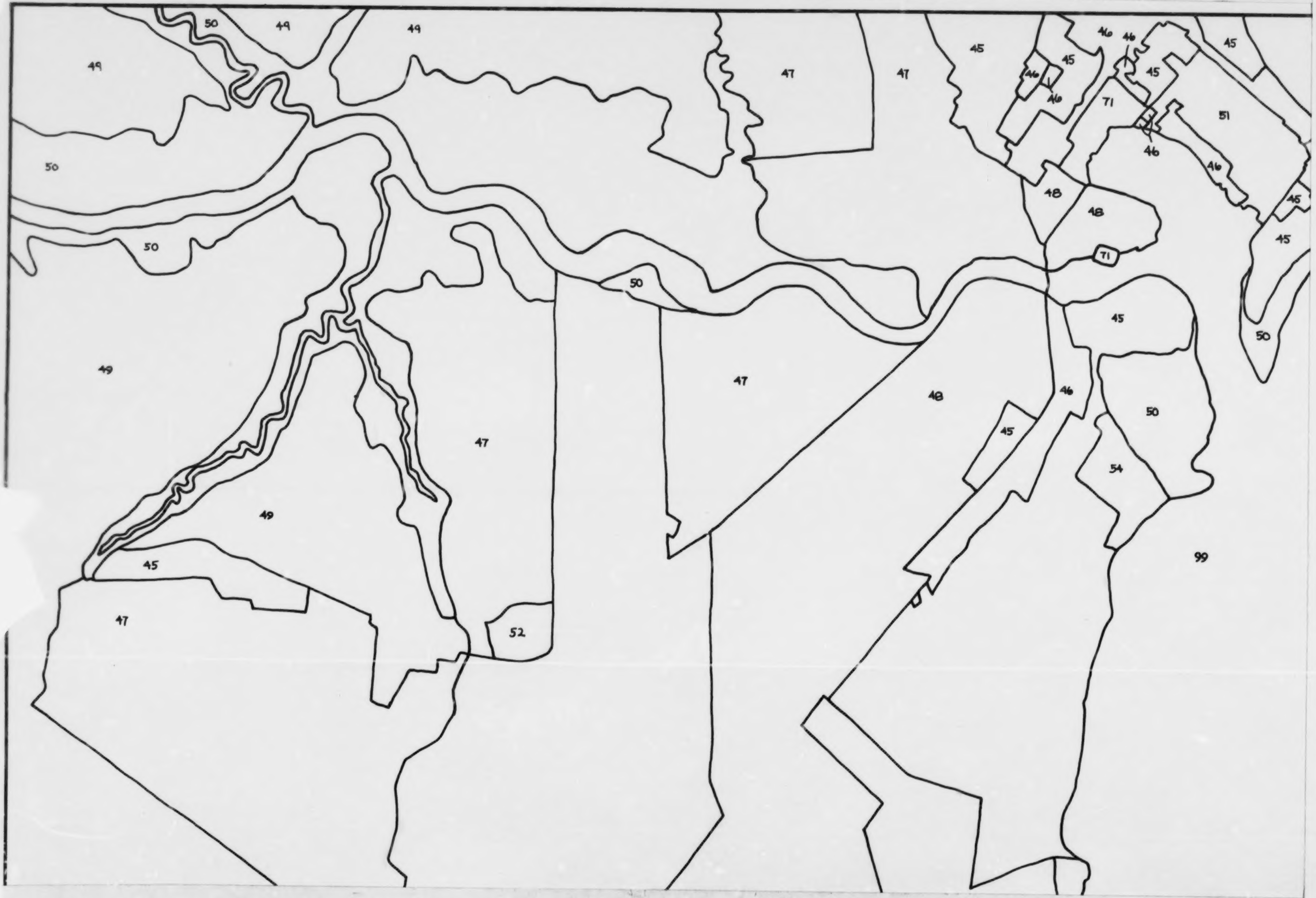
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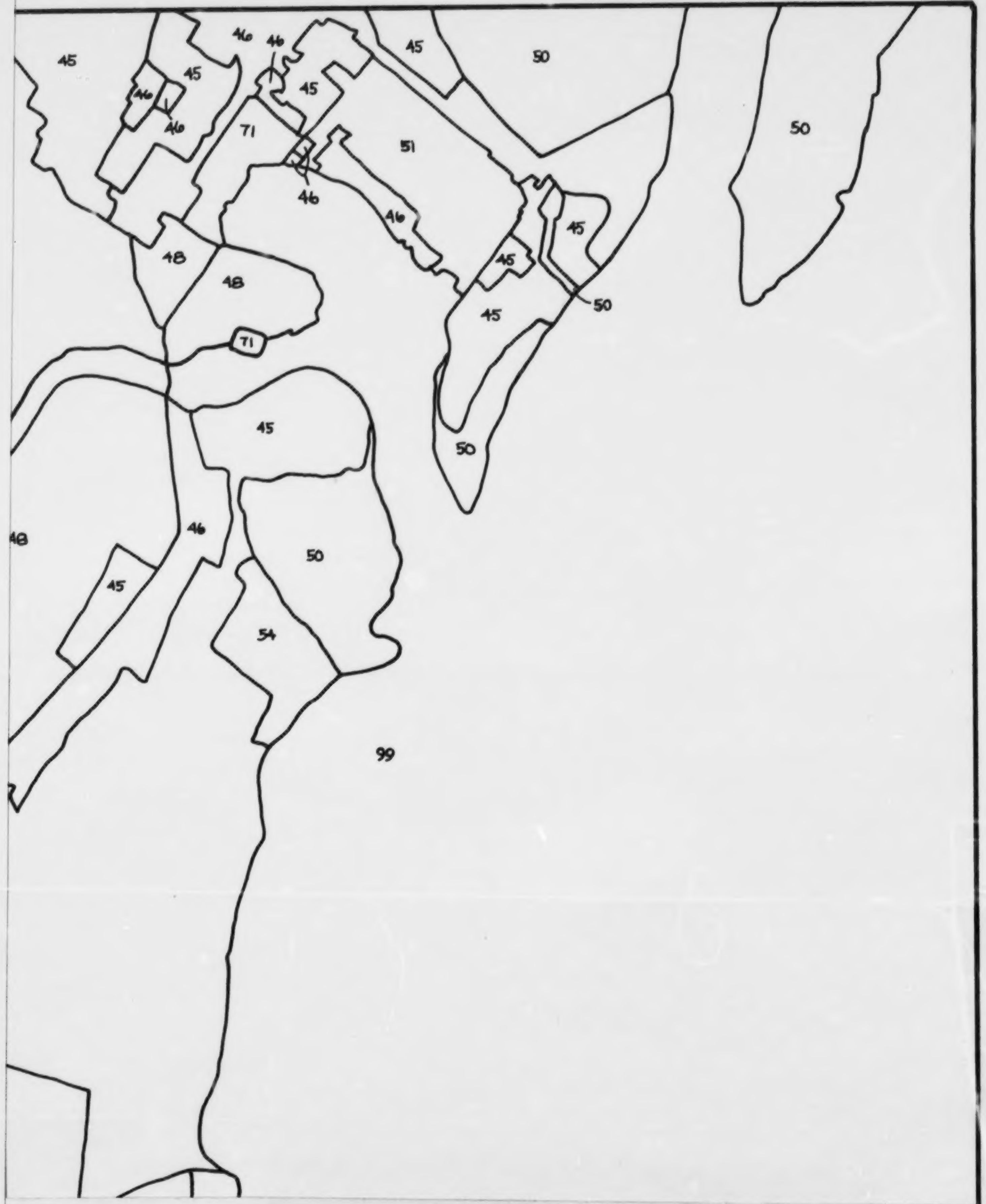
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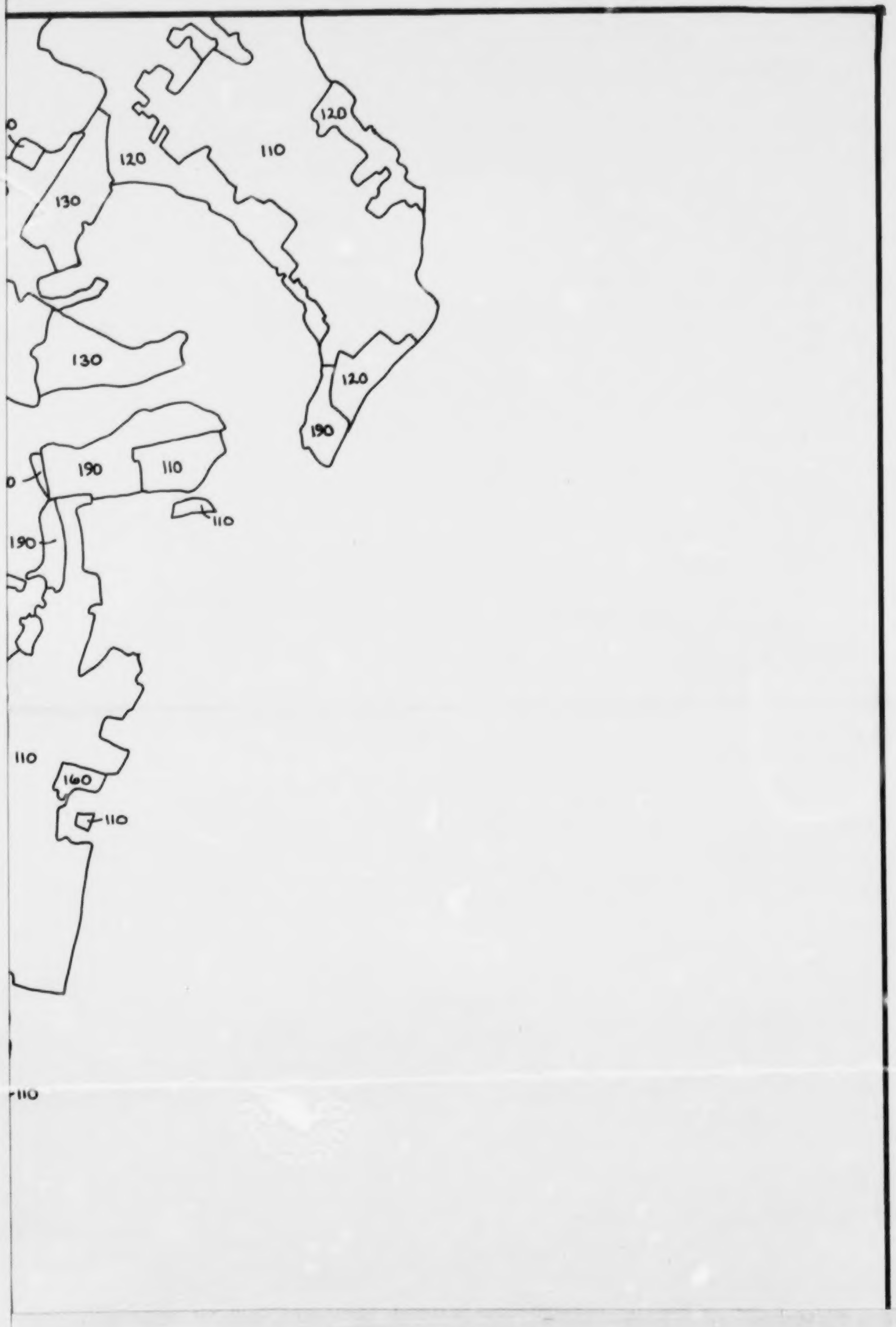
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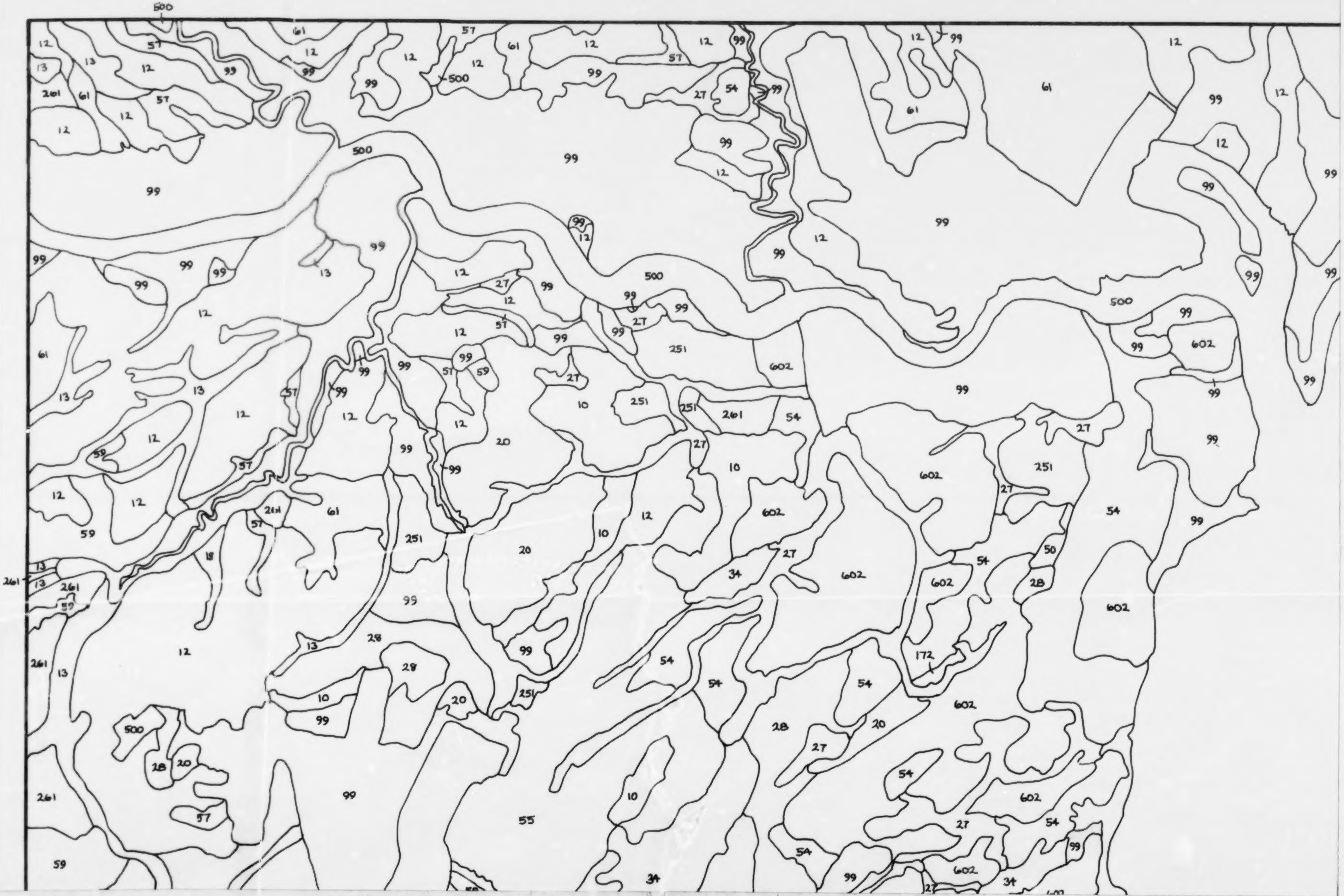
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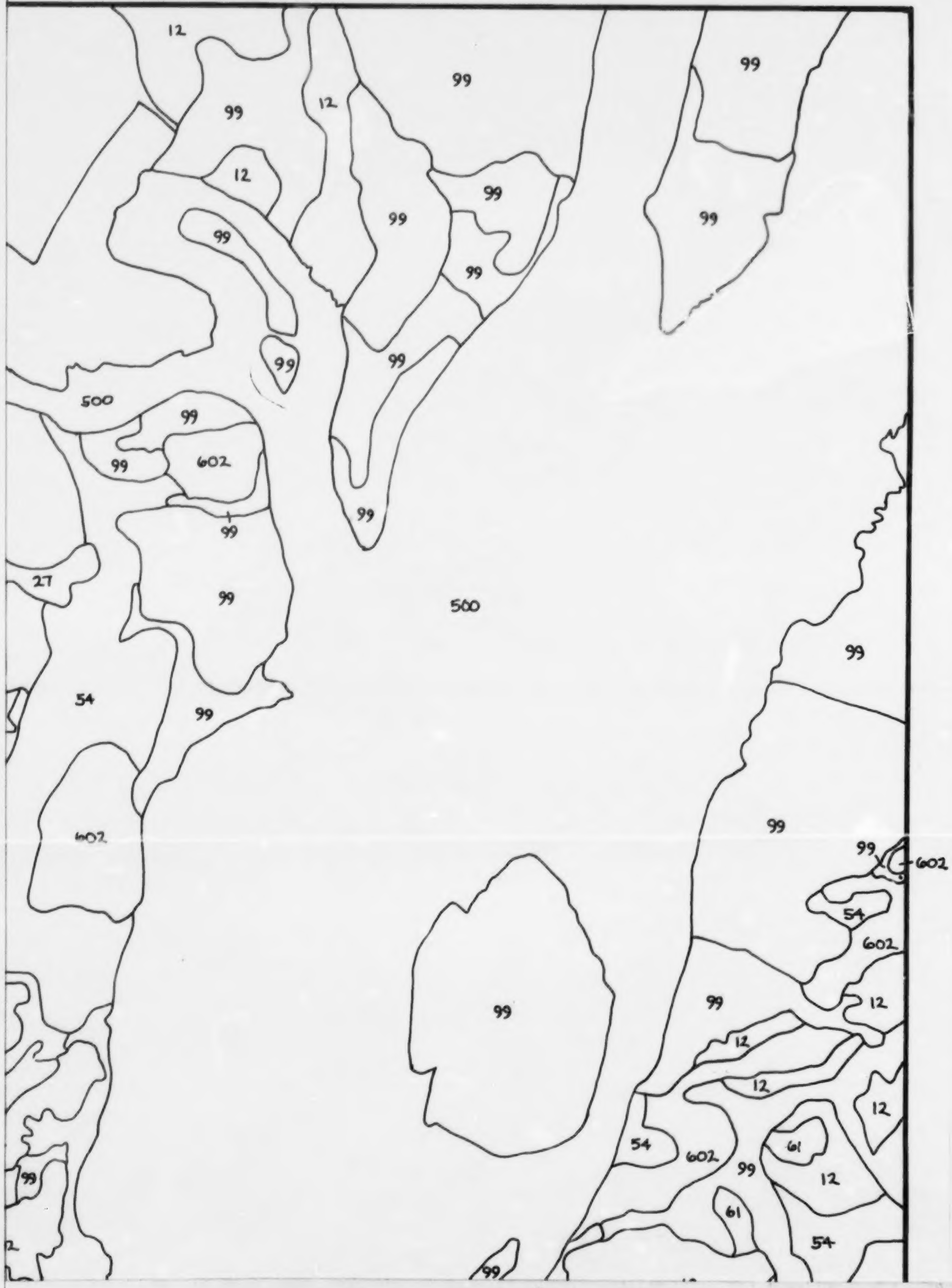
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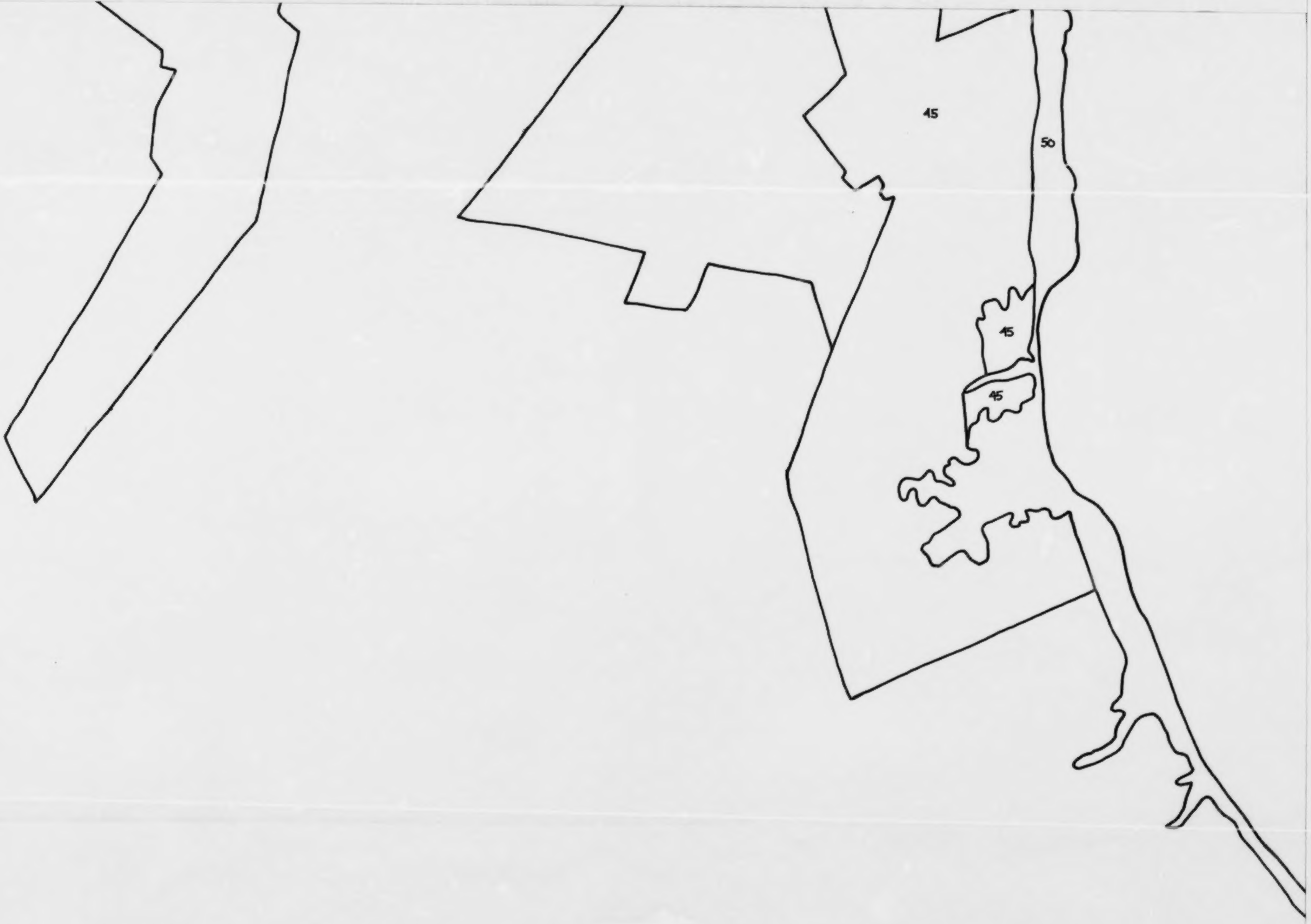
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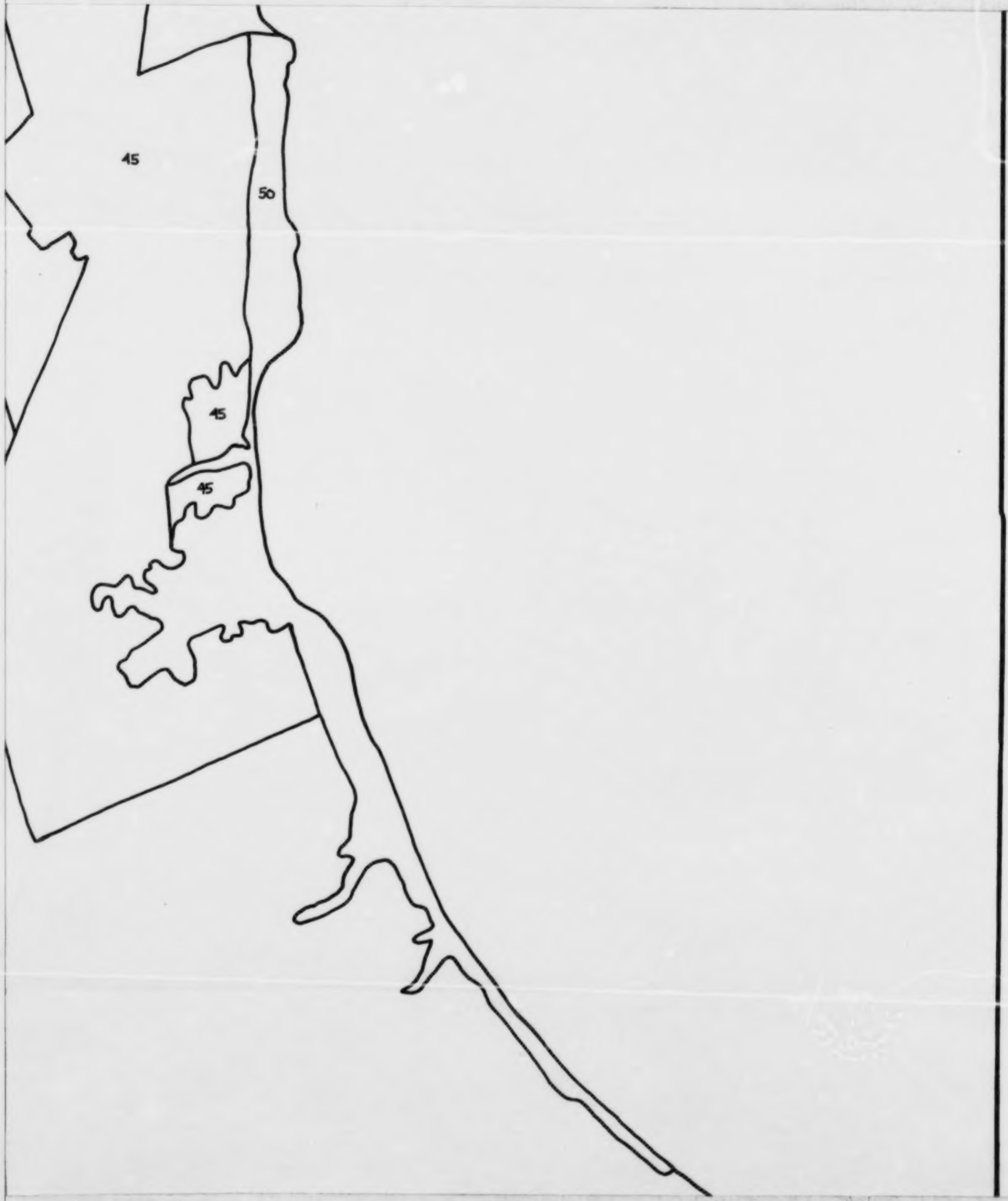
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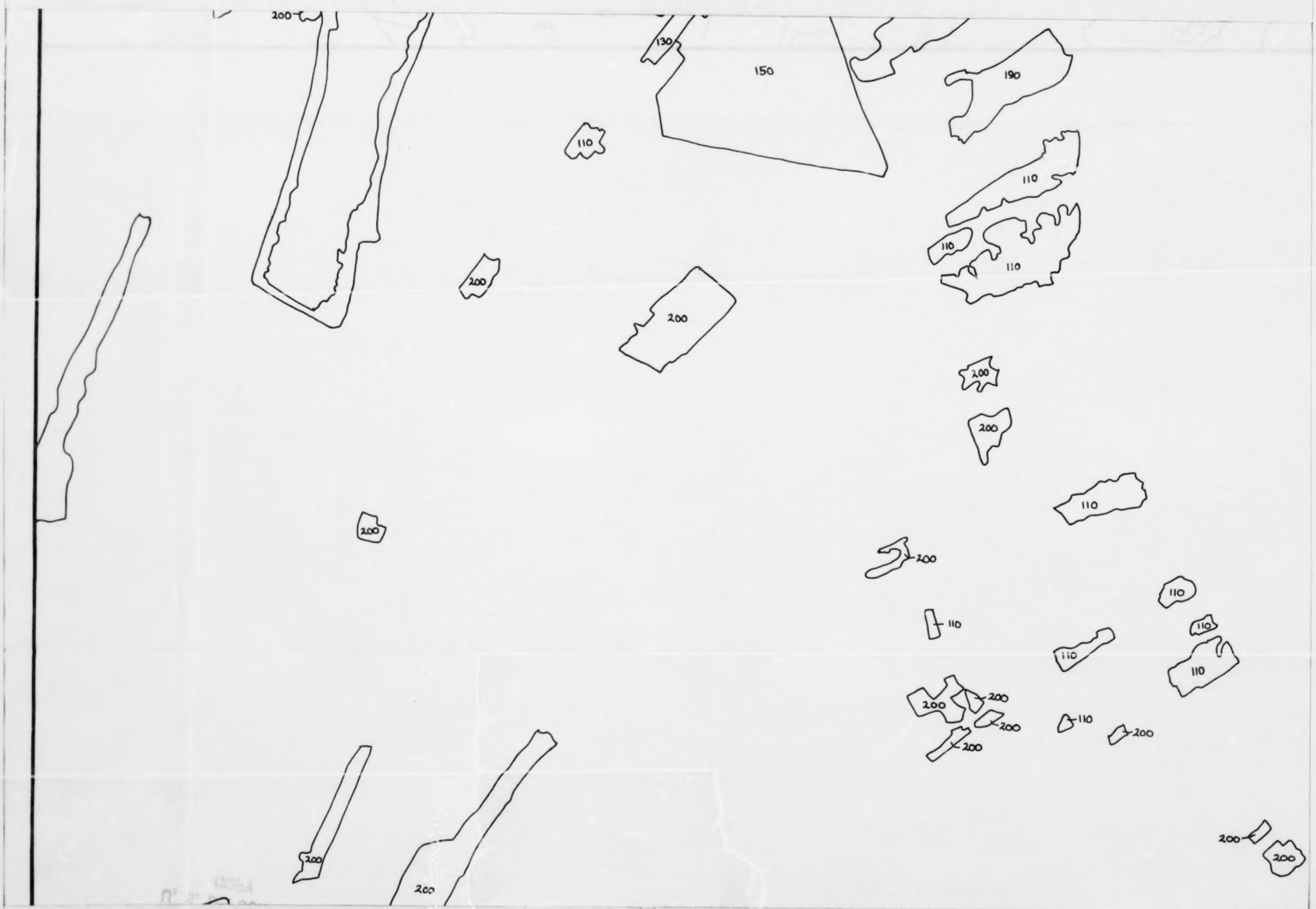
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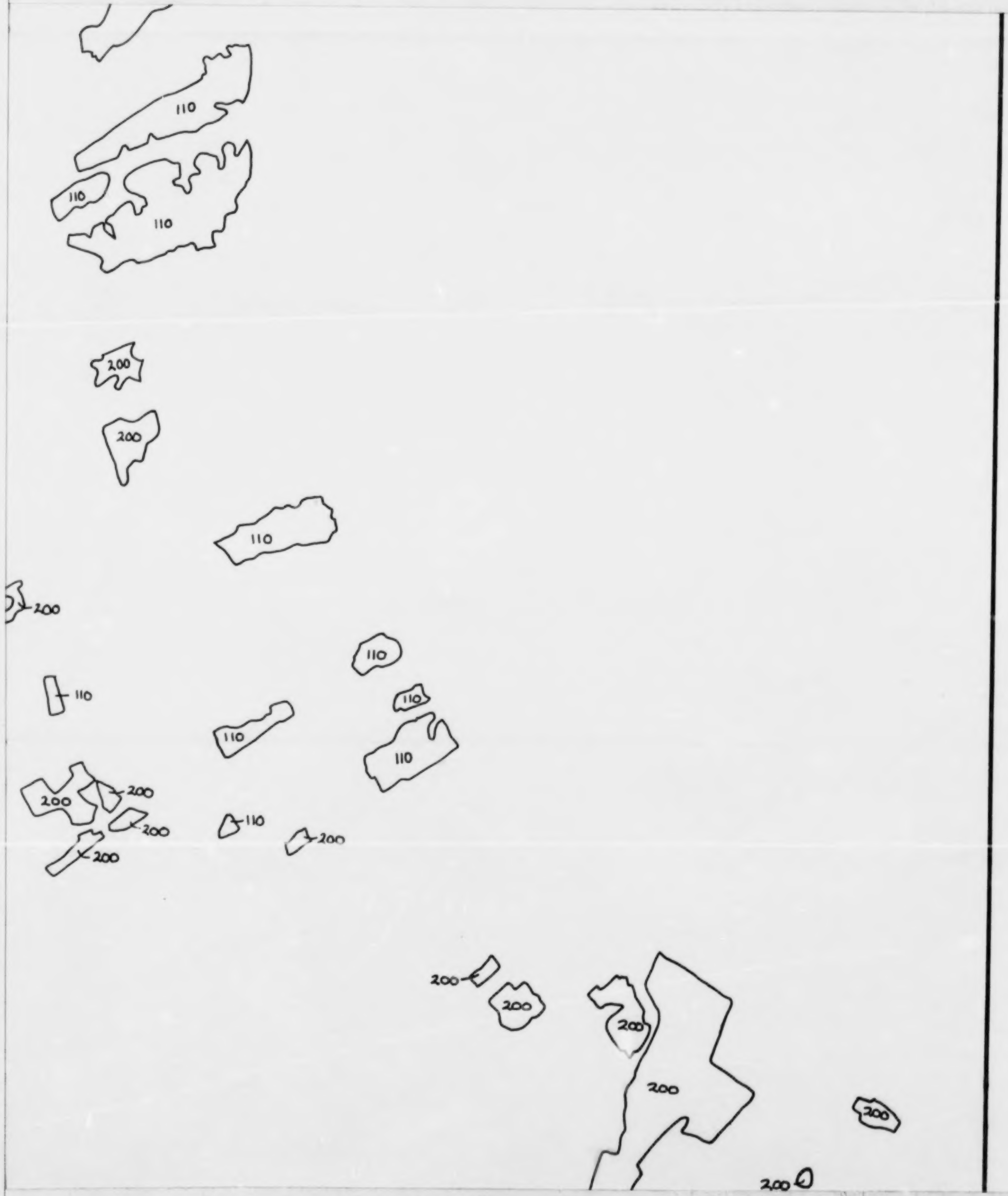
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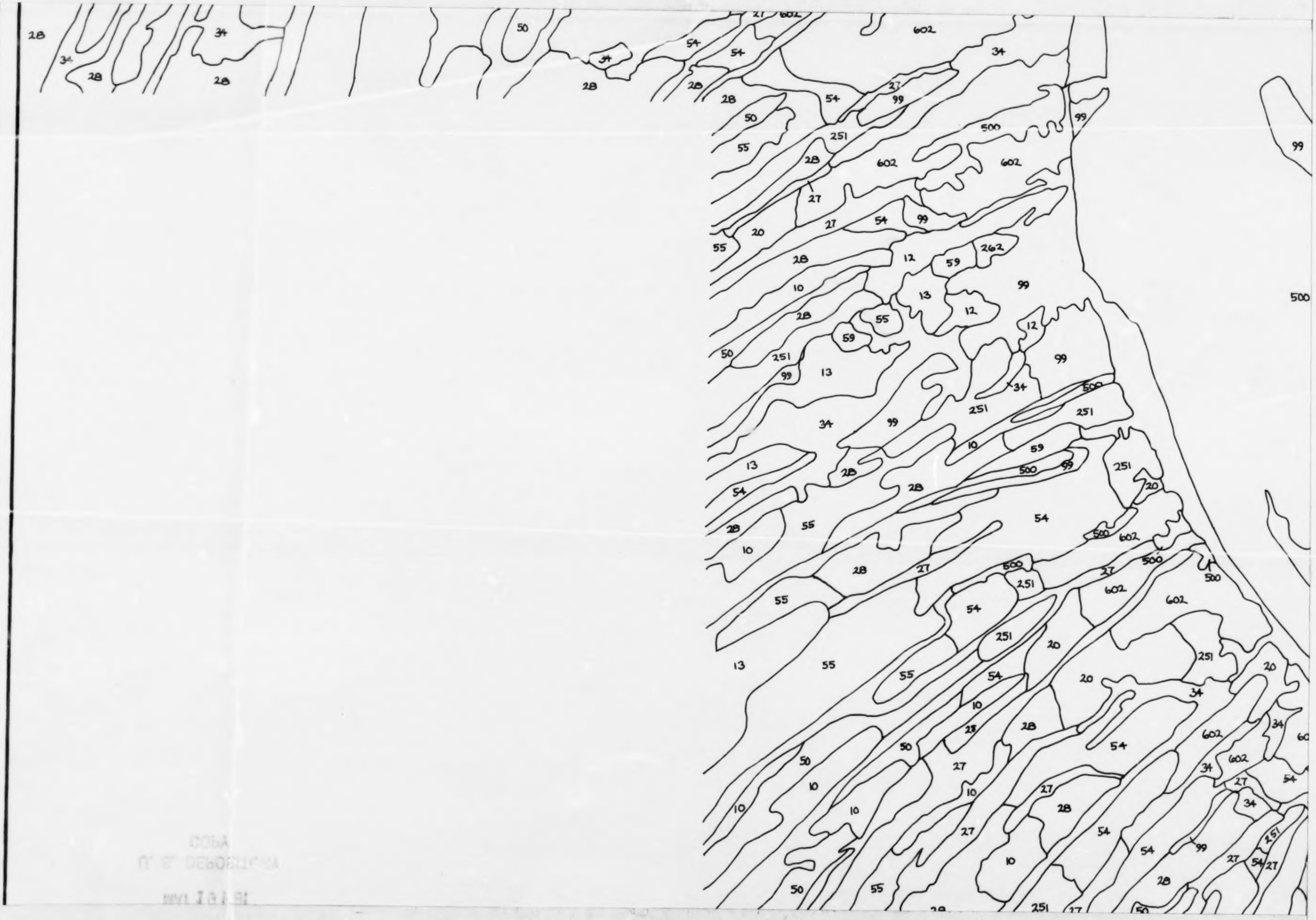
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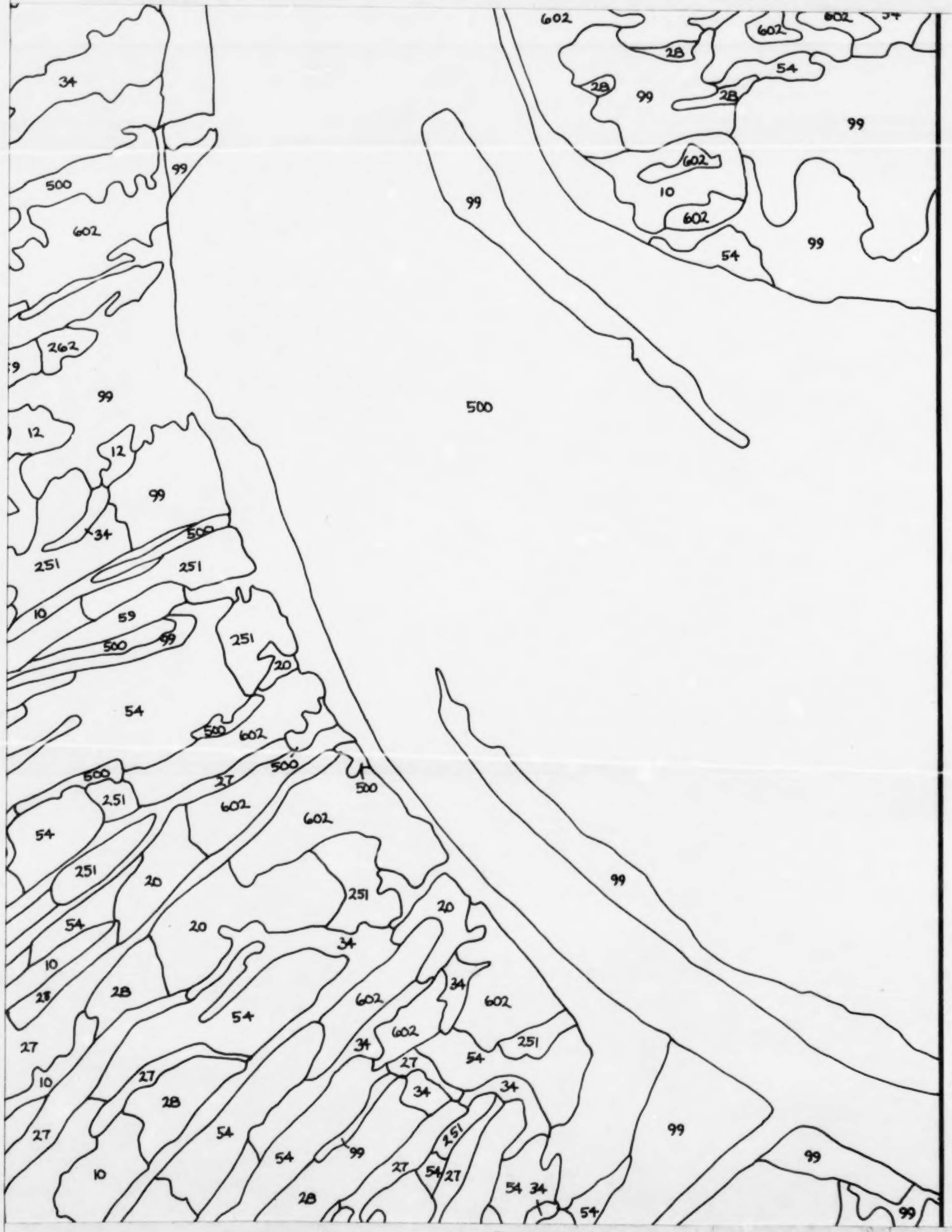
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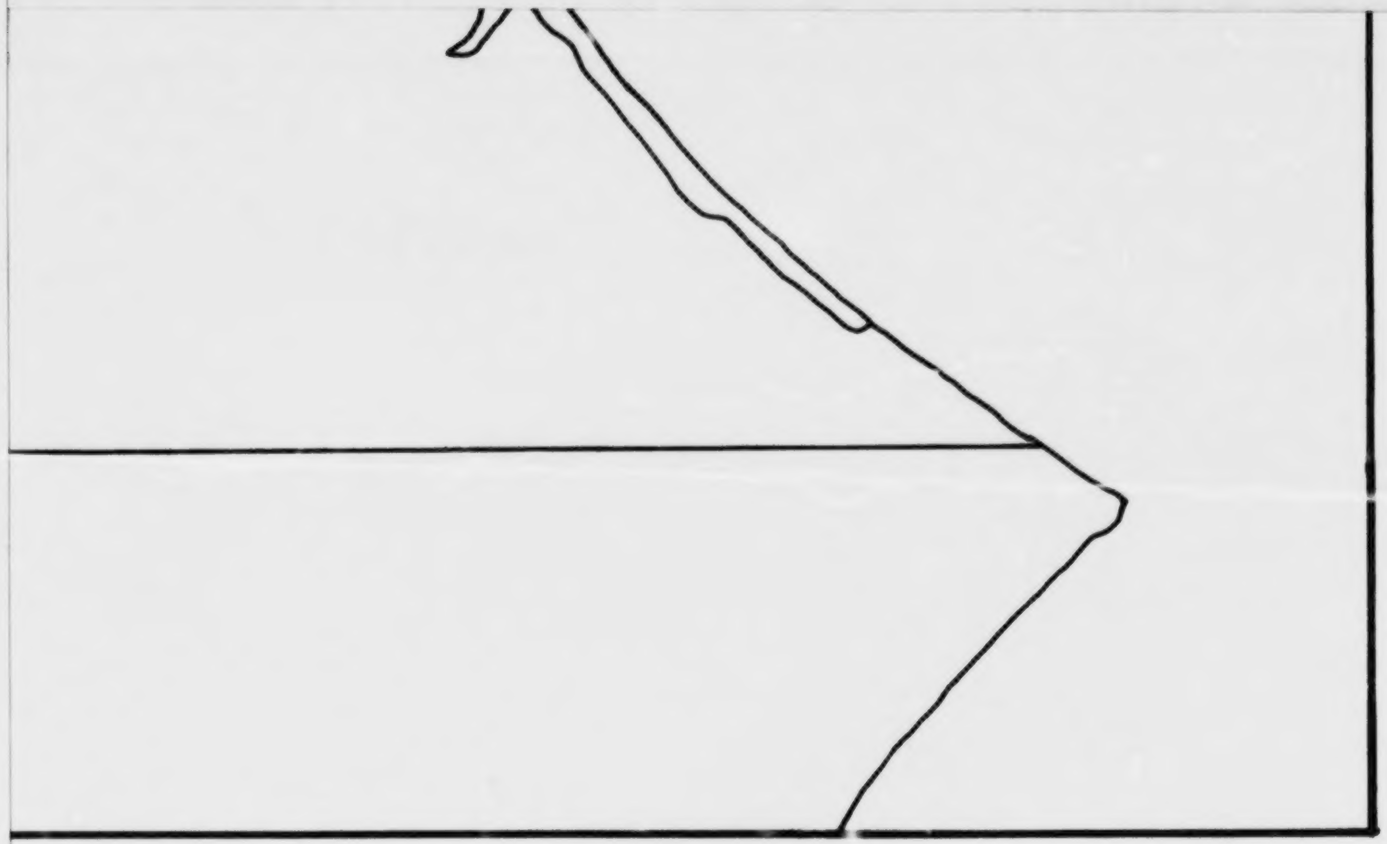

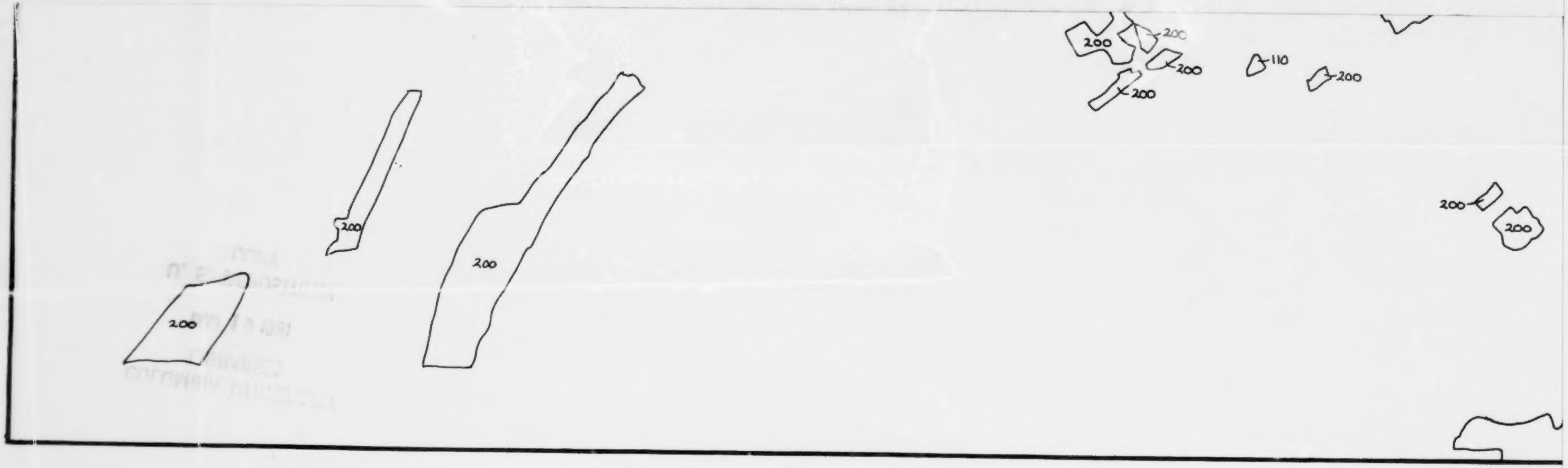
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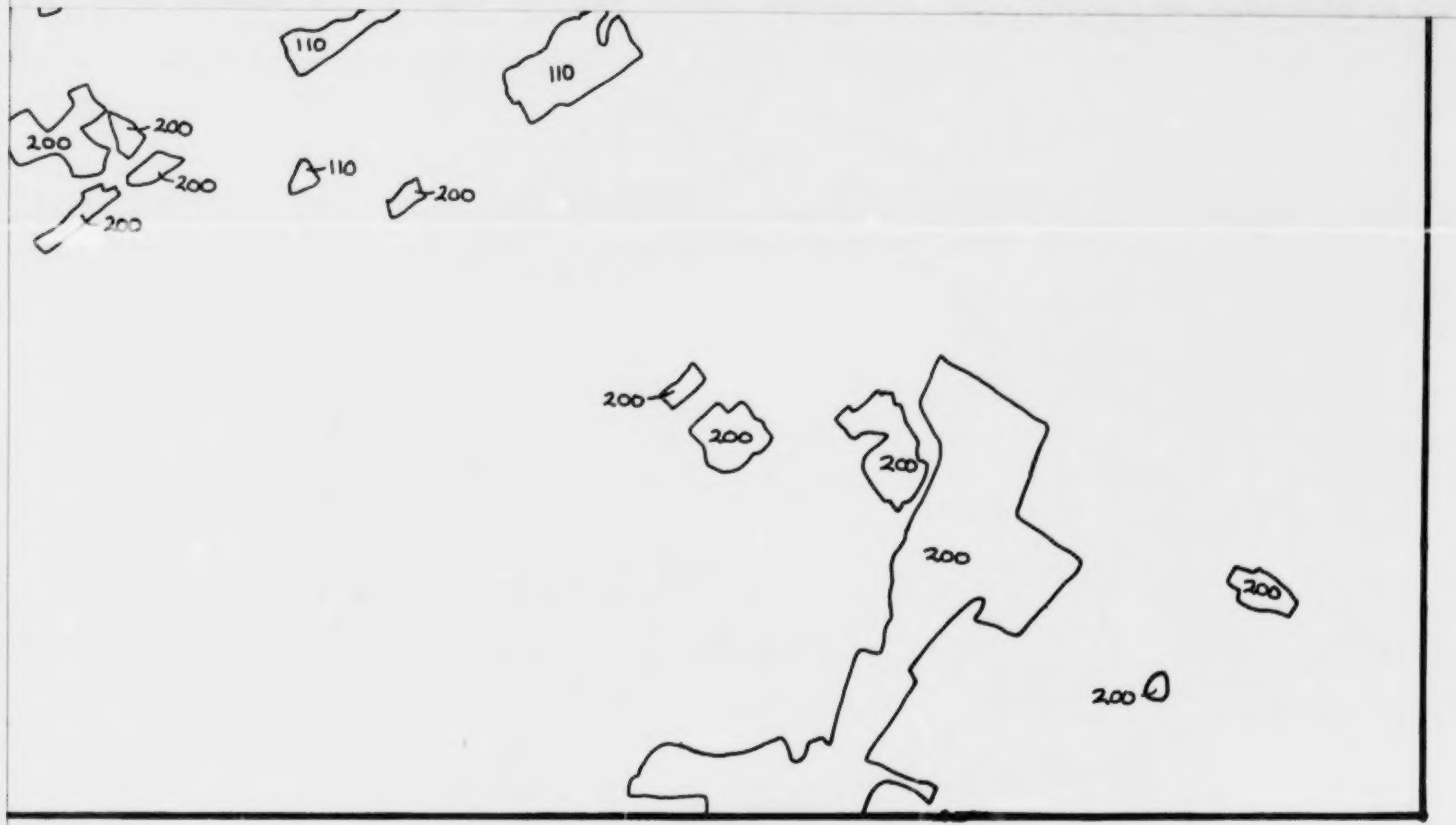
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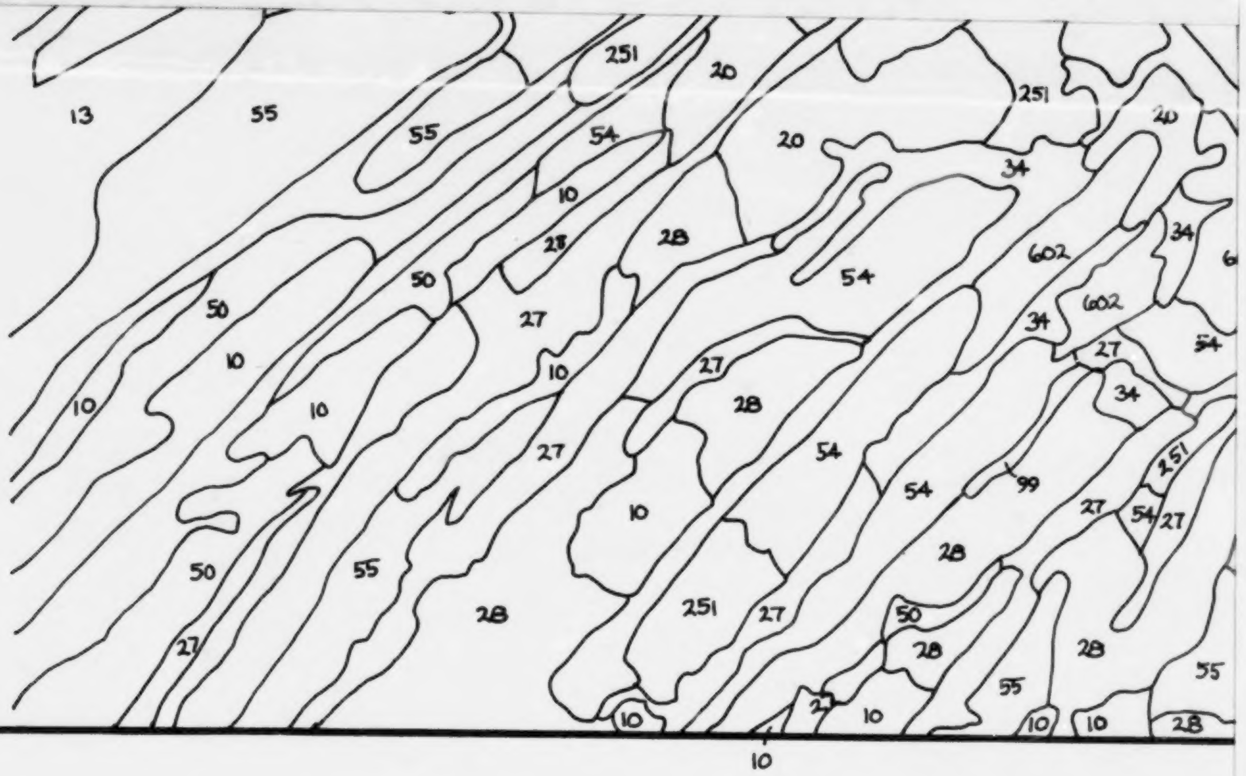
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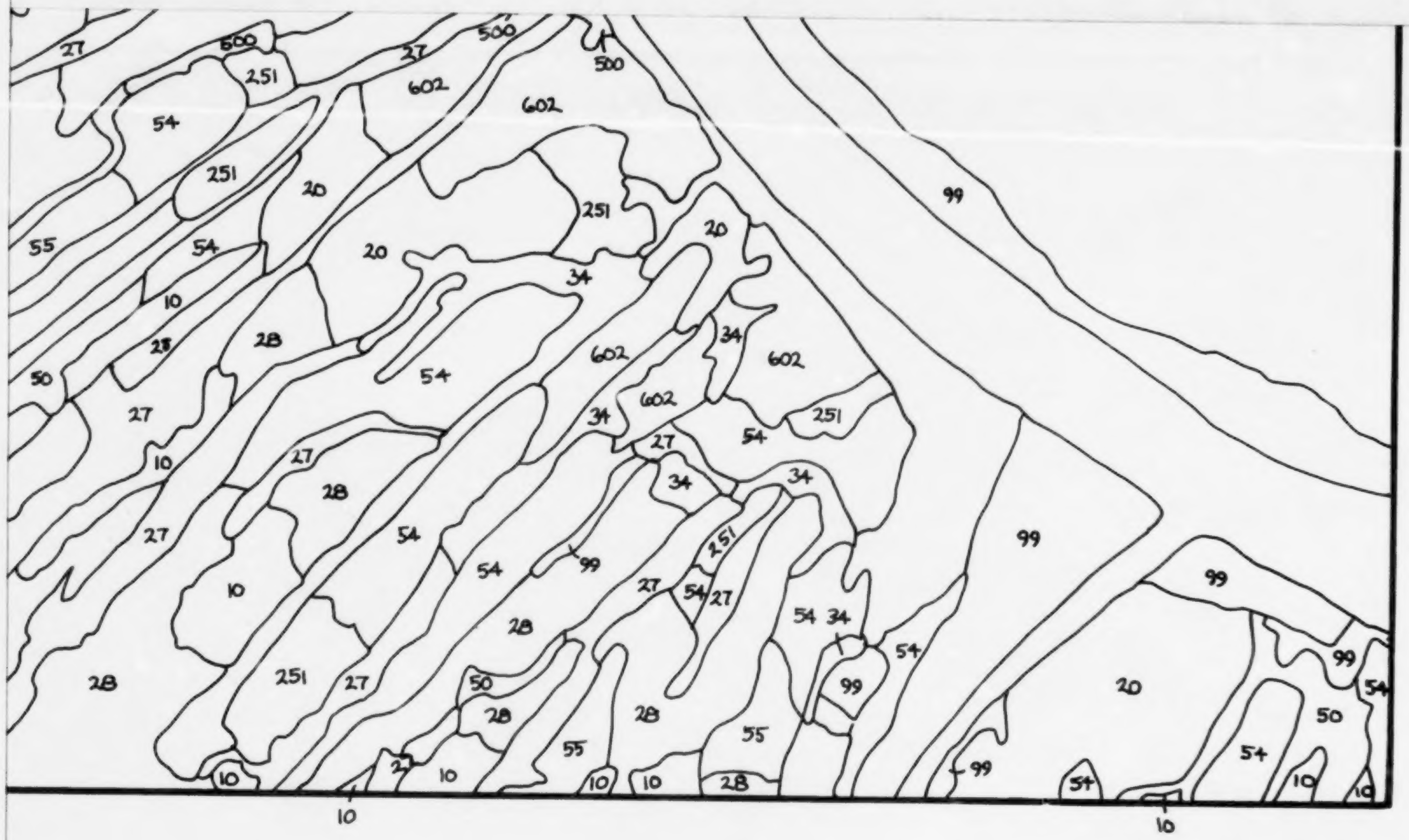

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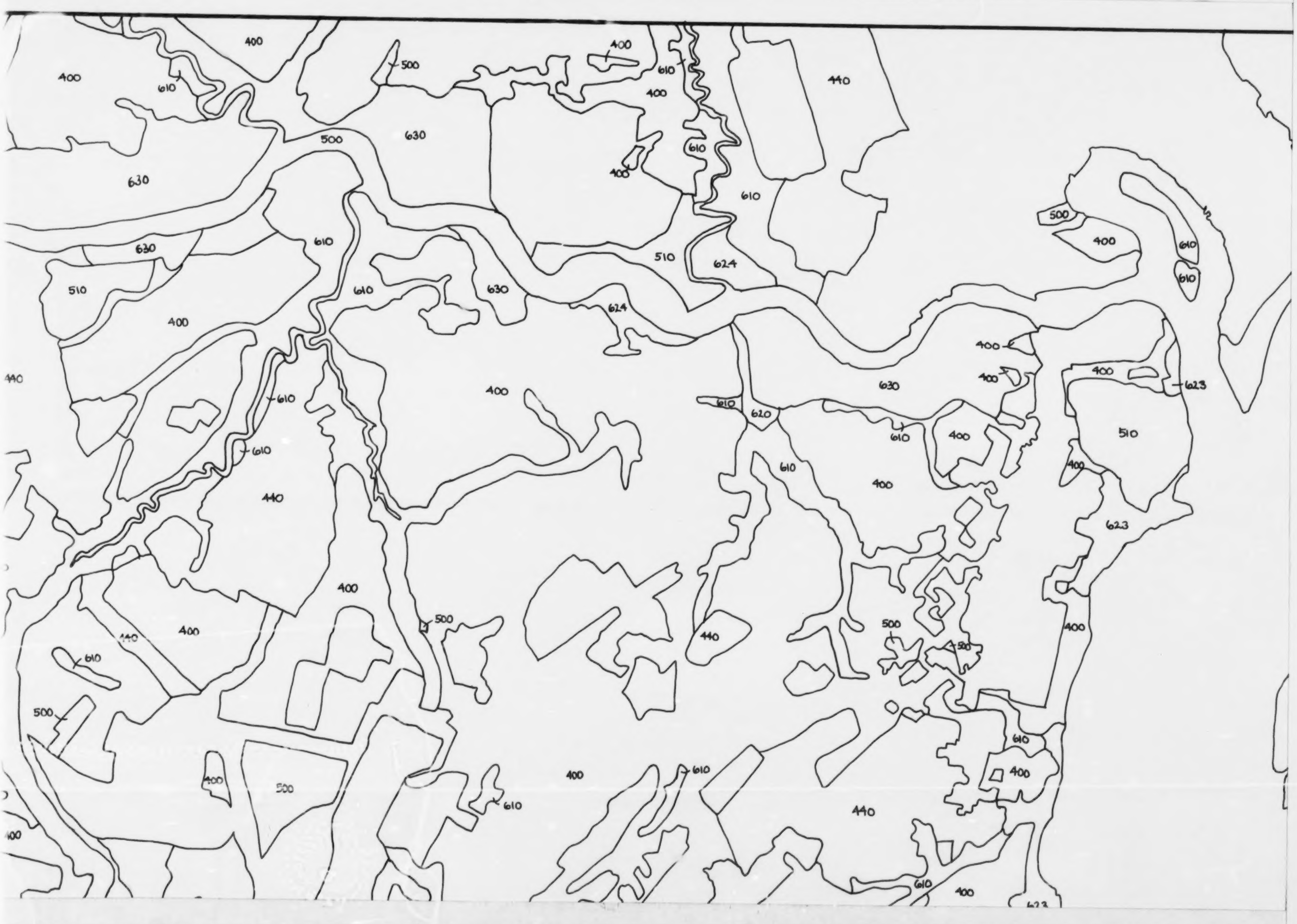
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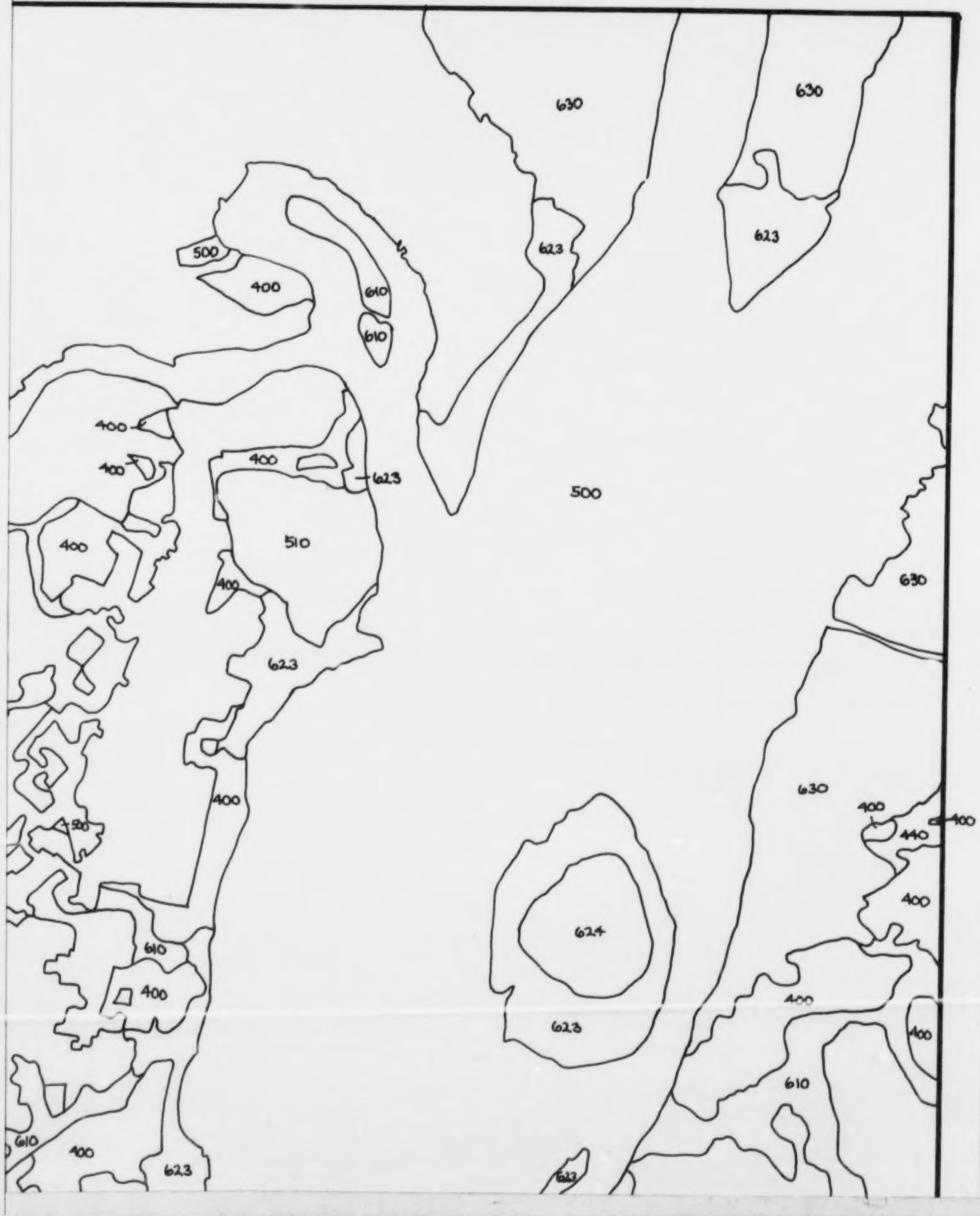
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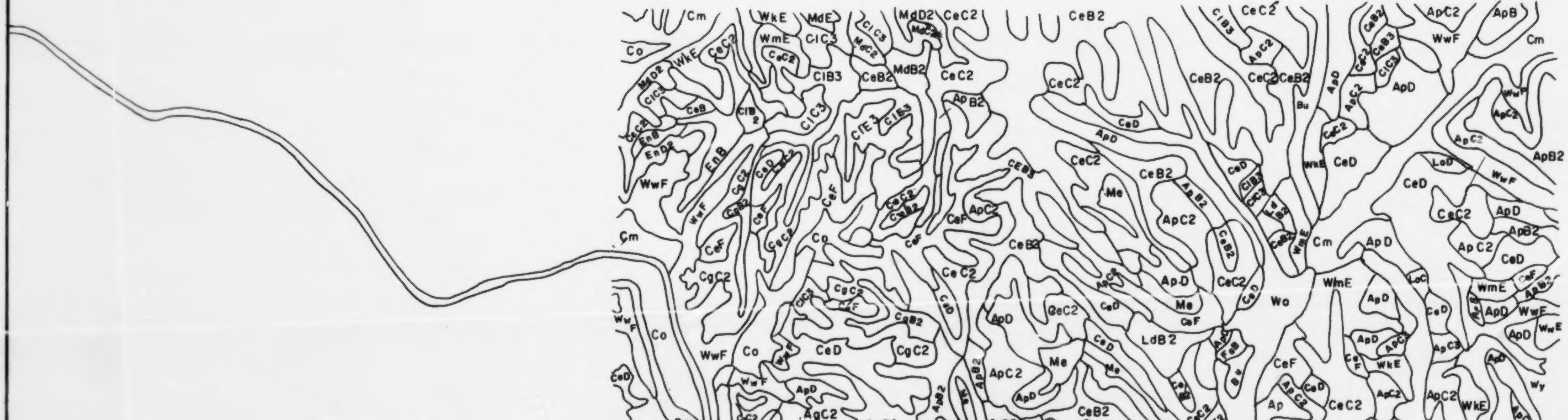
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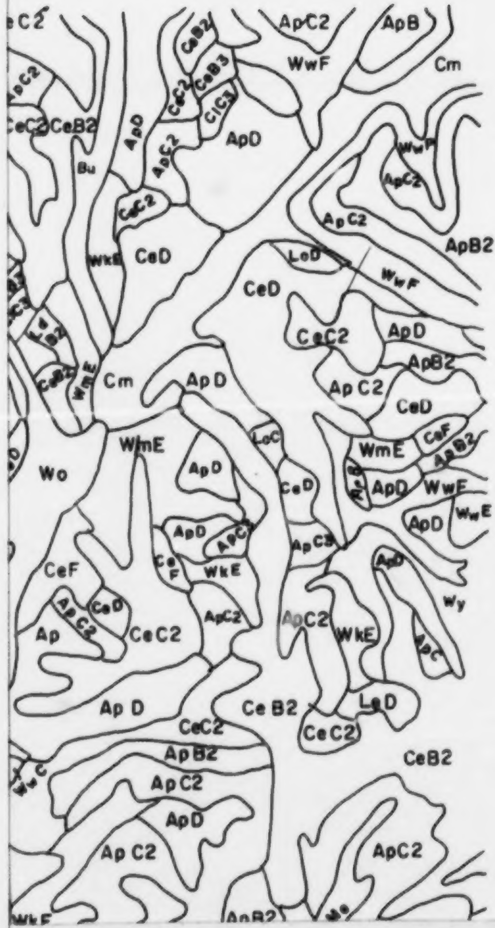
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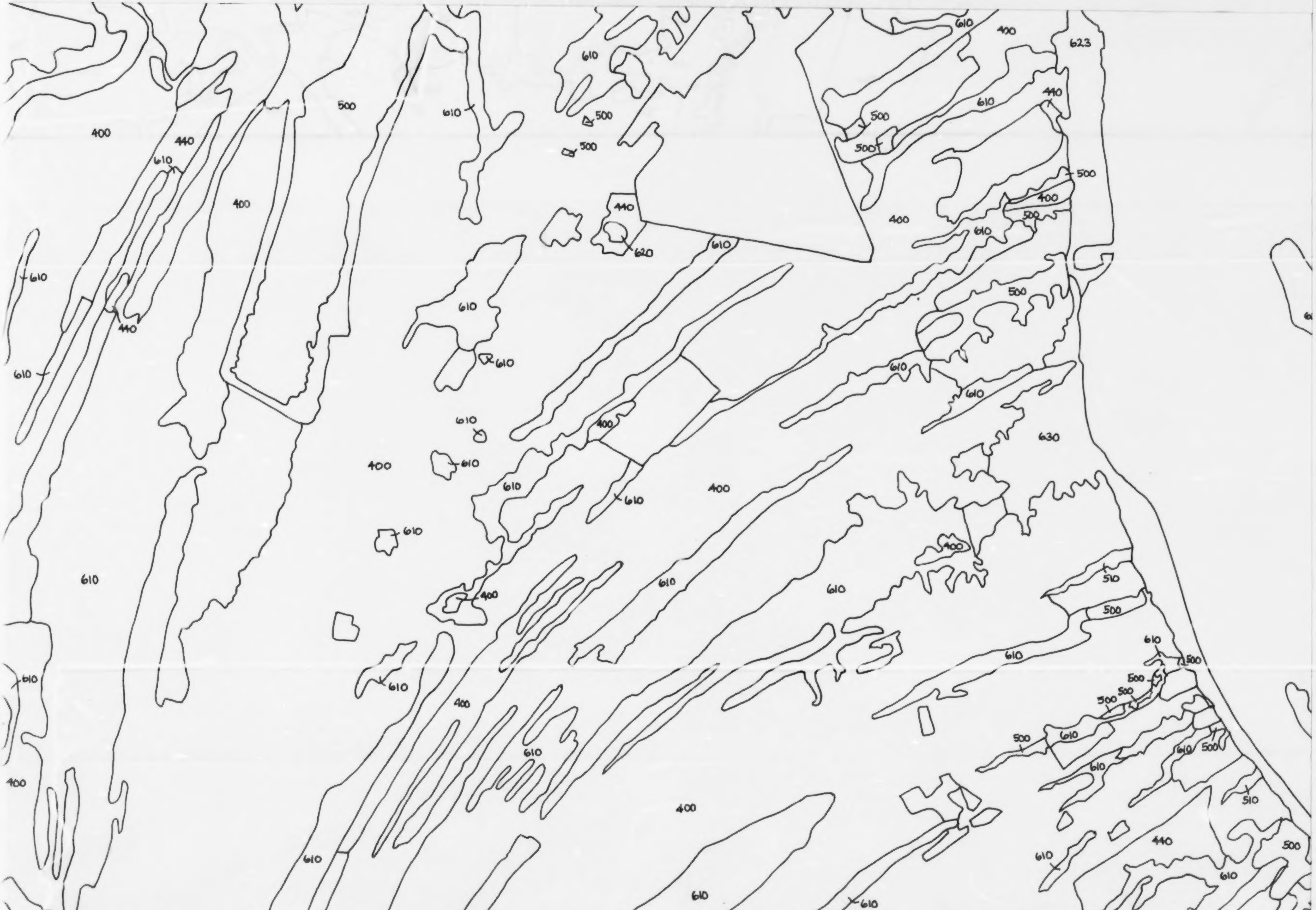
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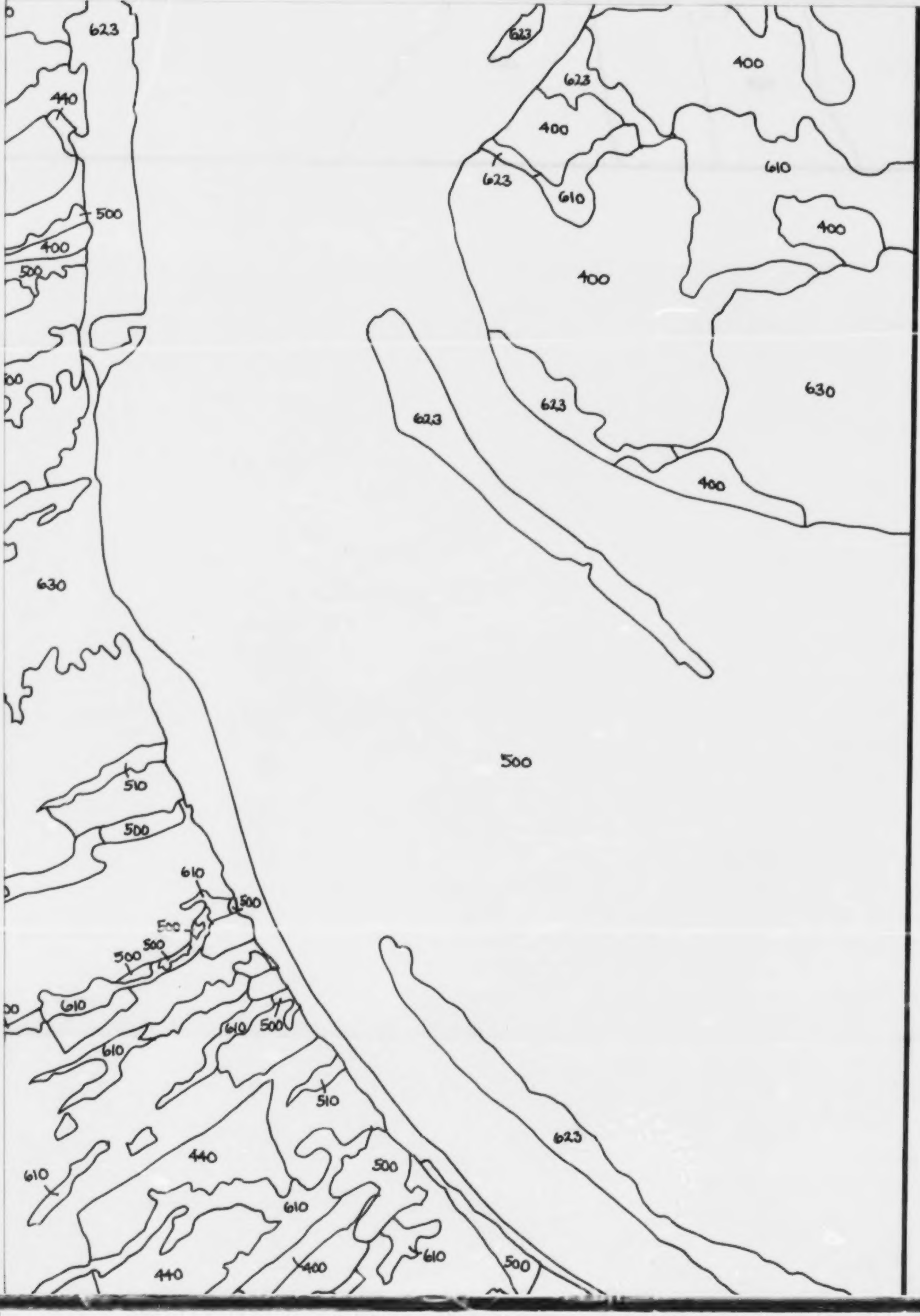
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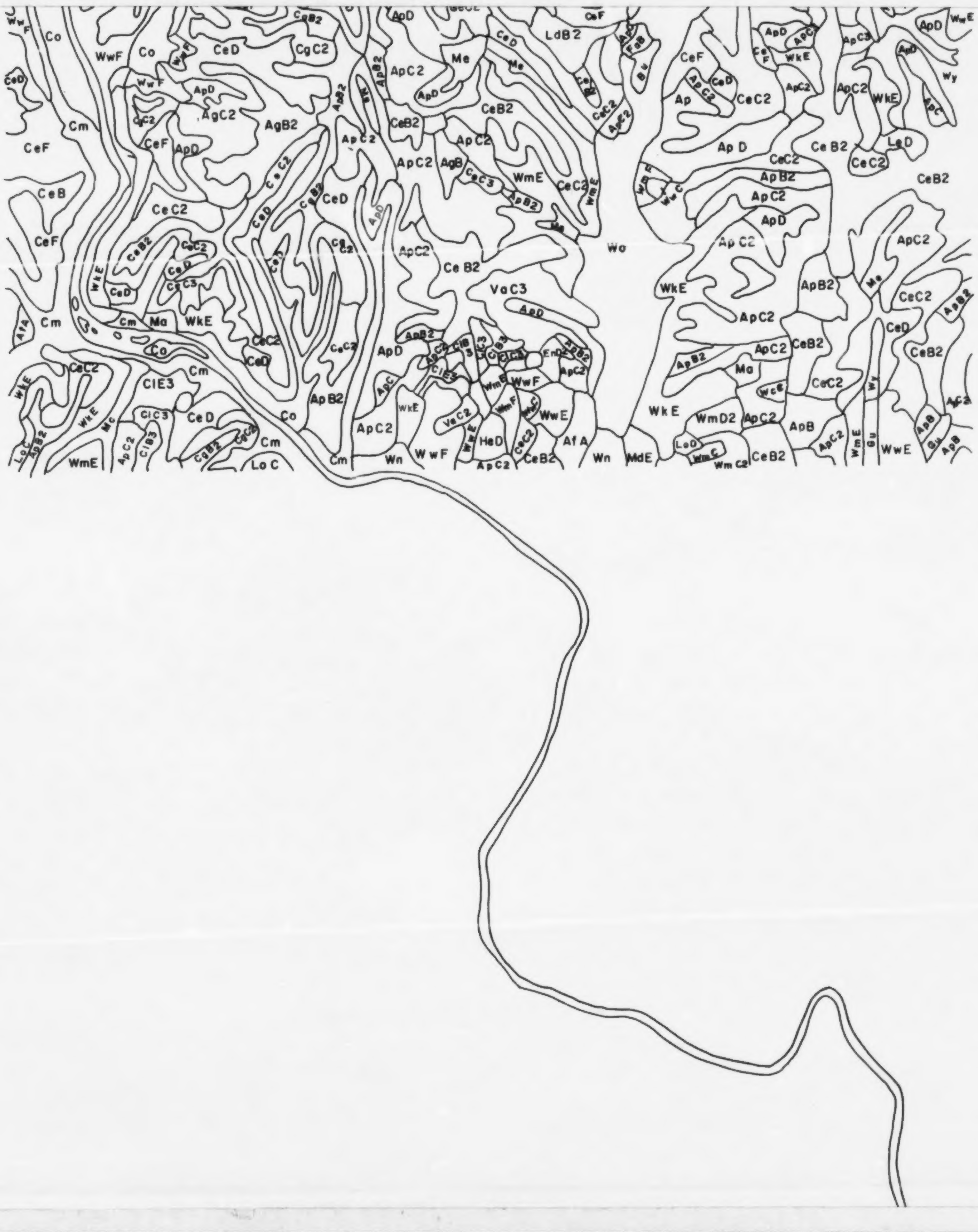
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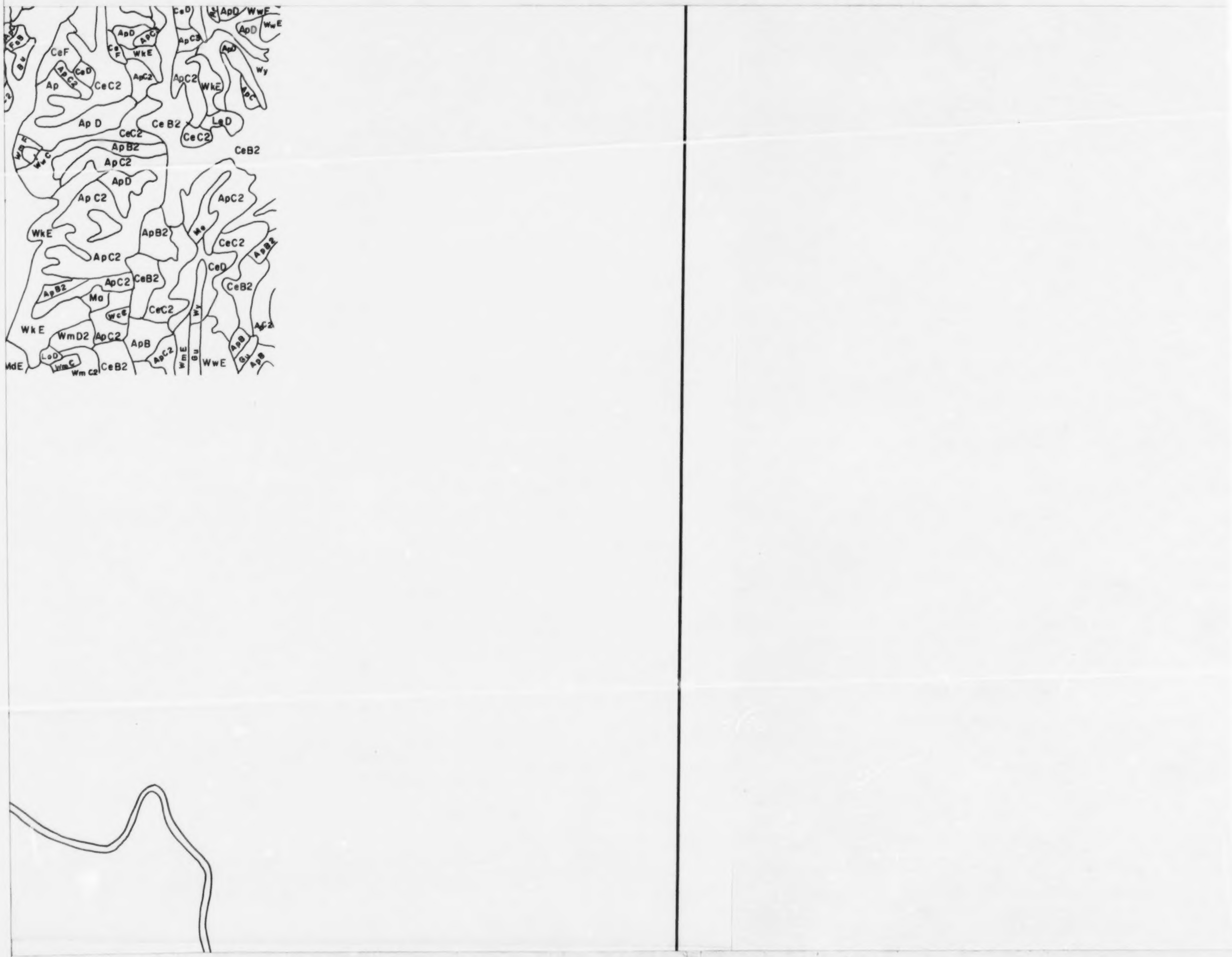
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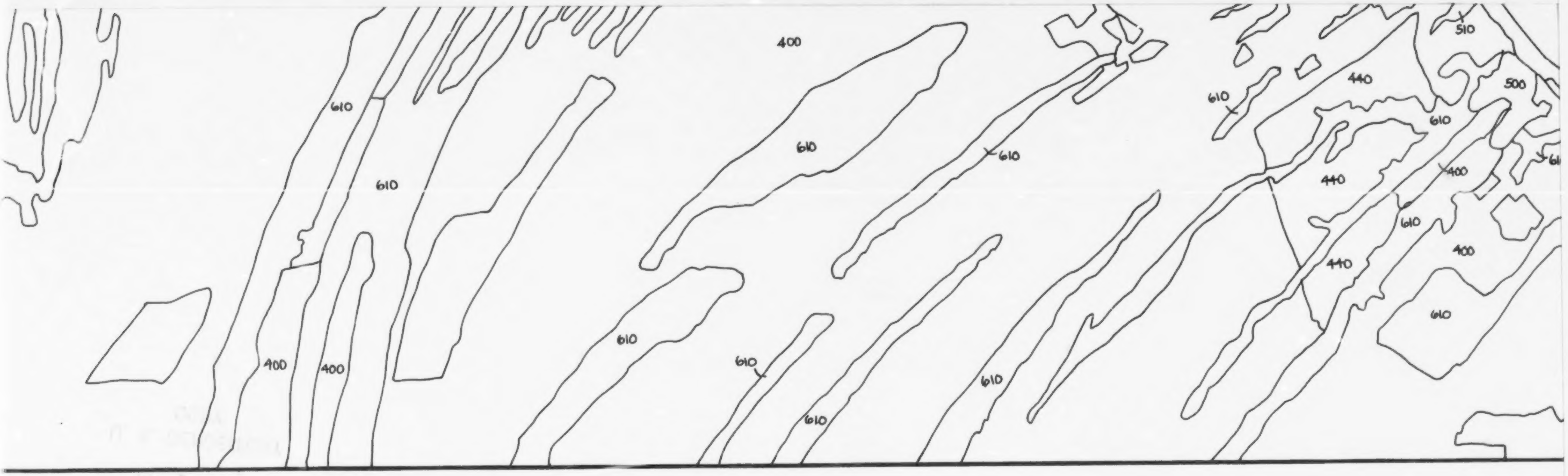
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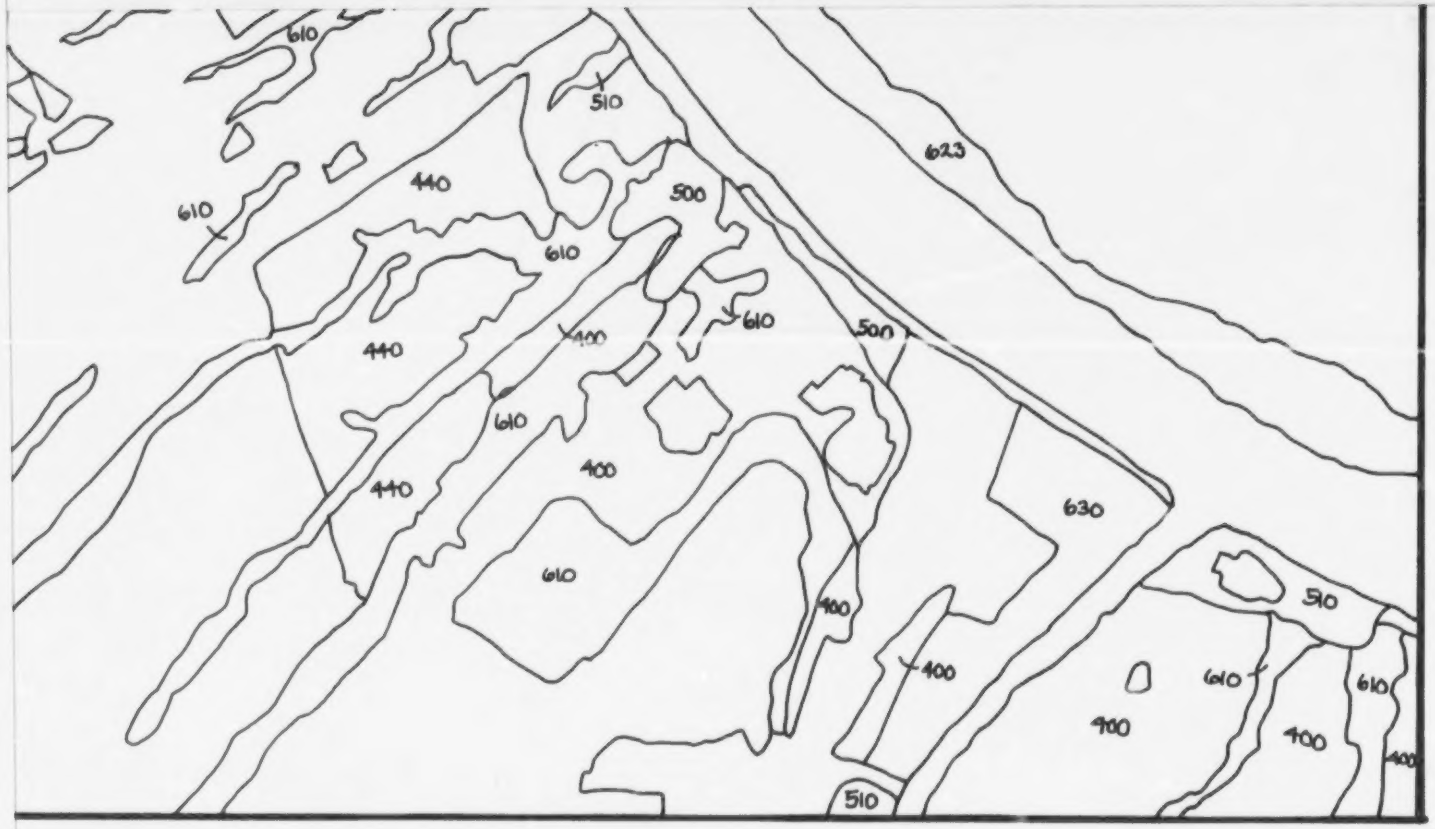
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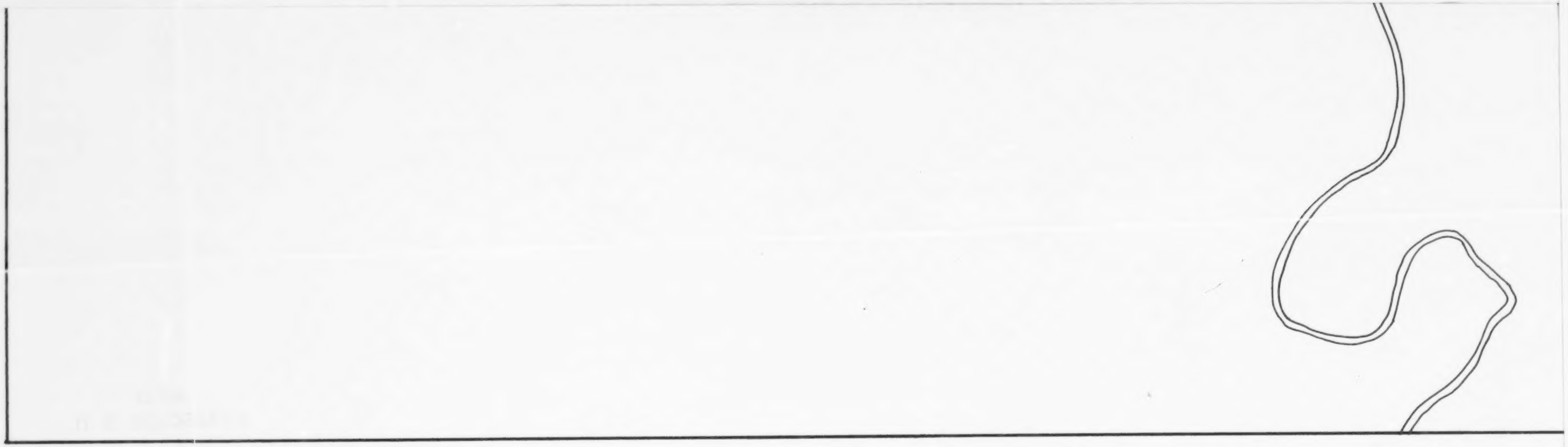
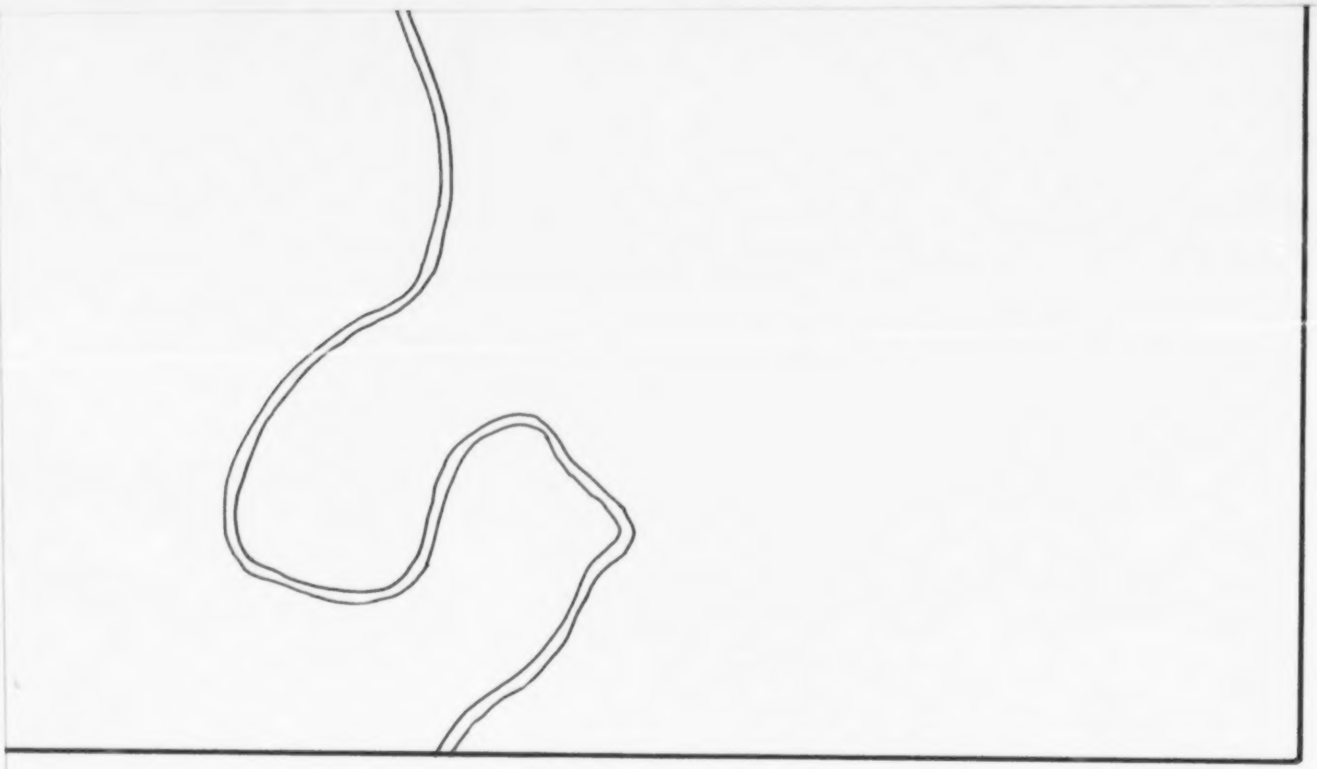


SOIL SERIES

Adapted From SCS Soil Survey, Wake County, North Carolina



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